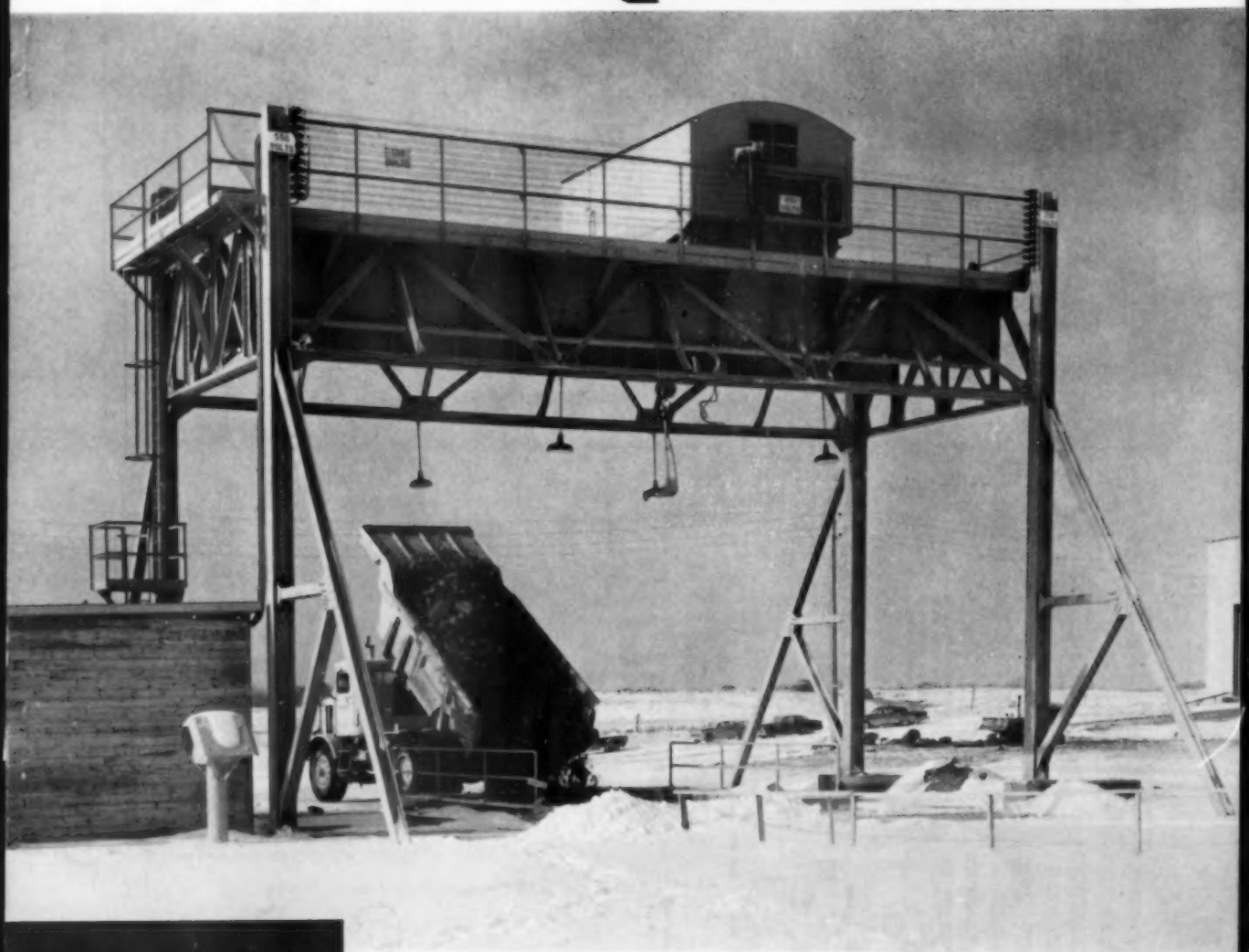
For producers of Sand, Gravel, Crushed Stone, Slag, Cement, Lime, Gypsum, and other nonmetallic minerals

FEBRUARY 1958

PIT and QUARRY



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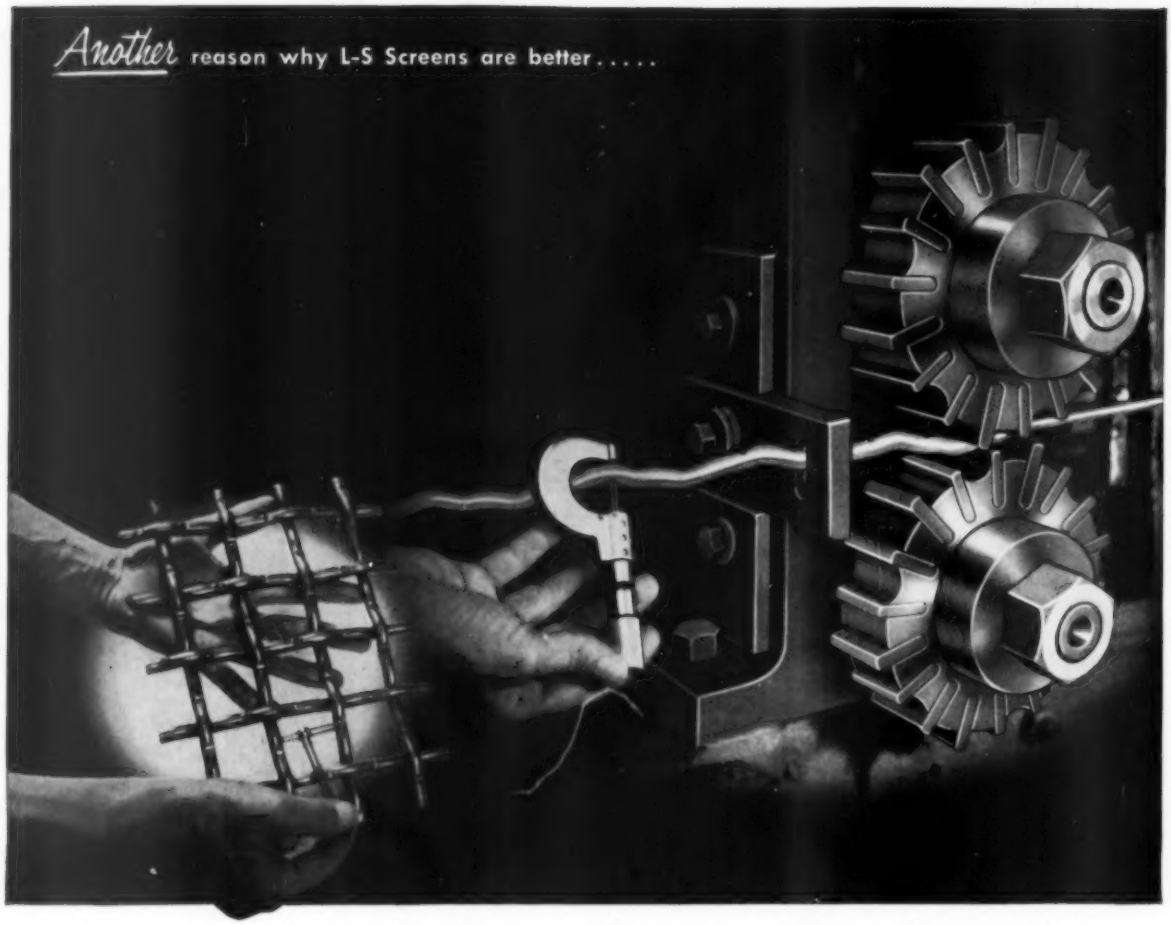
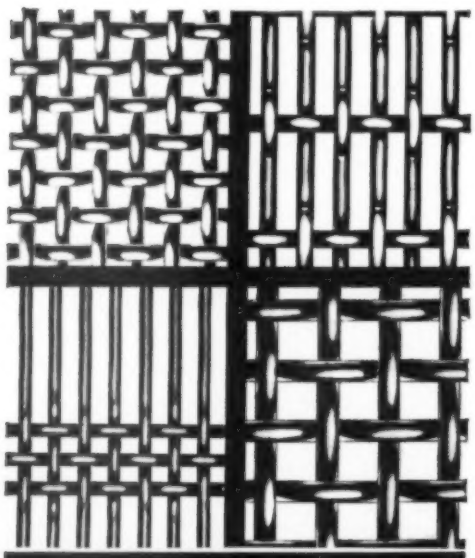
Winter Operations at the New Woodstock, Ont., Plant of Canada Cement Company.



1 of every 3 production employees perform inspection operations to insure perfection of LUDLOW-SAYLOR Screens



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pit and quarry

THE BASIC MAGAZINE IN A BASIC INDUSTRY

FEBRUARY 1958 Vol. 50 No. 8

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Cover Picture

• The winter scene on PIT AND QUARRY's cover this month disguises with a soft blanket of snow the starting point of a bustling industrial activity—the production of cement. Here, at the new Woodstock, Ont., plant of Canada Cement Company, crushed rock is started on its way through the wet-process facility in which cement is manufactured at the rate of 3,200,000 bbl. annually. The truck in the cover picture is dumping directly into the mouth of a 54-in. gyratory primary crusher. Crusher discharge is transferred *via* pan conveyors in an underground tunnel to an inclined belt for transport to the next stage in the flow. See PIT AND QUARRY, July, 1957, p. 72.

Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel, Slag and other nonmetallic minerals. Copyright 1958 by Pit and Quarry Publications, Inc., 431 S. Dearborn Street, Chicago 5, Illinois. PIT AND QUARRY magazine was founded by H. W. Baumgartner, October, 1916.

To subscribers: When requesting change of address, kindly send old as well as new address.

PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX

HIGHER reduction ratios

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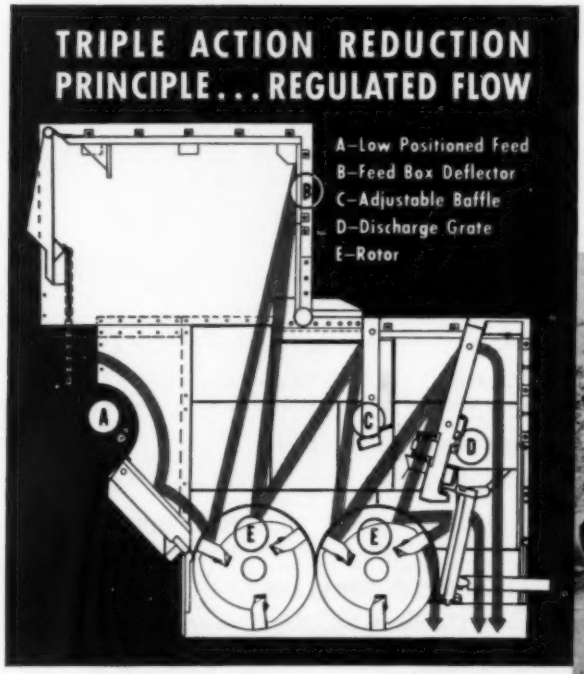
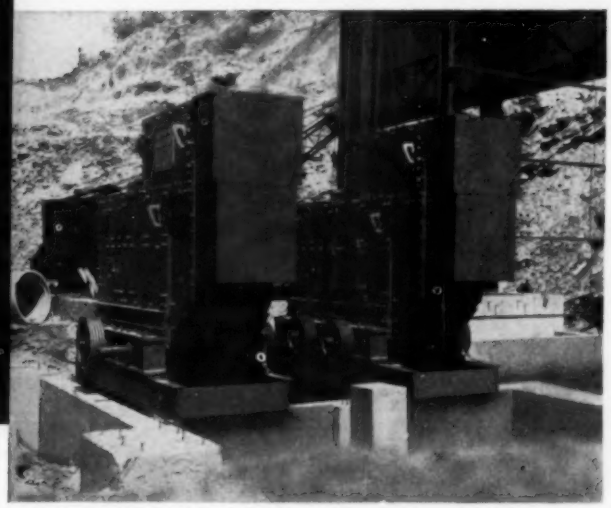
uses a new, proven concept in impact breaking

...for stationary or portable use



This heavy duty impact breaker is designed for primary and secondary breaking of non-abrasive stone and similar materials in a single unit. It is a dual rotor, up-running breaker featuring a multi-stage, triple action reduction principle and regulated flow.



Two Cuber Seniors in service at a Pennsylvania cement plant, operating as secondaries in a closed circuit, producing raw mill feed. The Cuber Senior can also be used as a portable unit.

THE KENNEDY CUBER SENIOR

- delivers high capacities of cubical material at lower cost —with lower horsepower per ton
- handles quarry rock that will pass its feed opening
- can be operated in a closed circuit to produce 100% passing 1" with many types of rock
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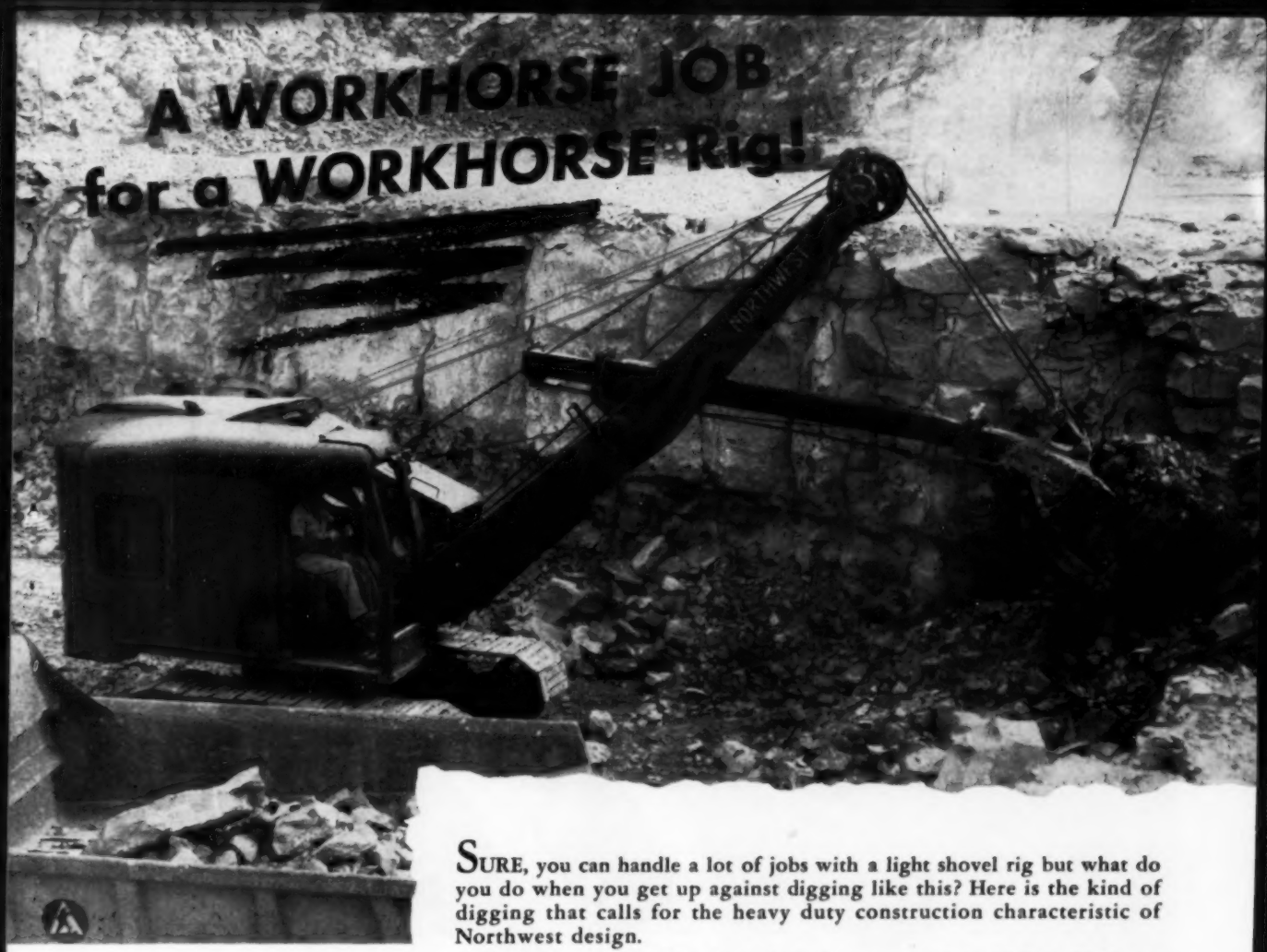
A WORKHORSE JOB for a WORKHORSE Rig!



SURE, you can handle a lot of jobs with a light shovel rig but what do you do when you get up against digging like this? Here is the kind of digging that calls for the heavy duty construction characteristic of Northwest design.

This Model 25, ¾-yd. Northwest is in the quarries of the McMinville Stone Co., Inc., at McMinville, Tenn., and it's handling over 130 tons an hour. The Northwest Model 25 is the workhorse of the ¾-yd. field. It is a *real* Rock Shovel—a full ¾-yd. machine capable of handling jobs that lighter machines of the same rated capacity can't handle.

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It's a workhorse for workhorse jobs. Get full details before you buy.

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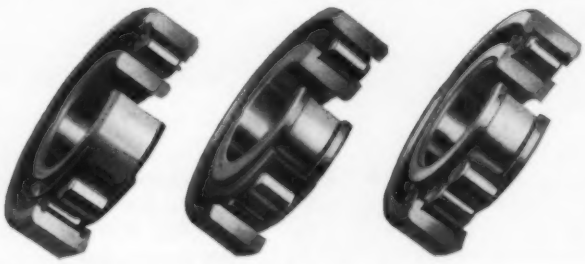
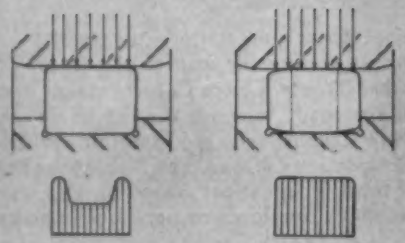
Tru-Rol Bearings with crowned rollers are available in 3 types



Stamped Steel Retainer with Guide Lips | Segmented Steel Retainer | Full Roller

Comparative Stress Patterns under Uniform Loads for Straight and Crowned Cylindrical Rollers



Stress pattern for a straight cylindrical roller under load. Note uneven end-loading.

Stress pattern for crowned roller under load. Crowning radius is exaggerated for clarity.

● Rollway engineering service is available to help you select exactly the right bearings for your needs. Write us.

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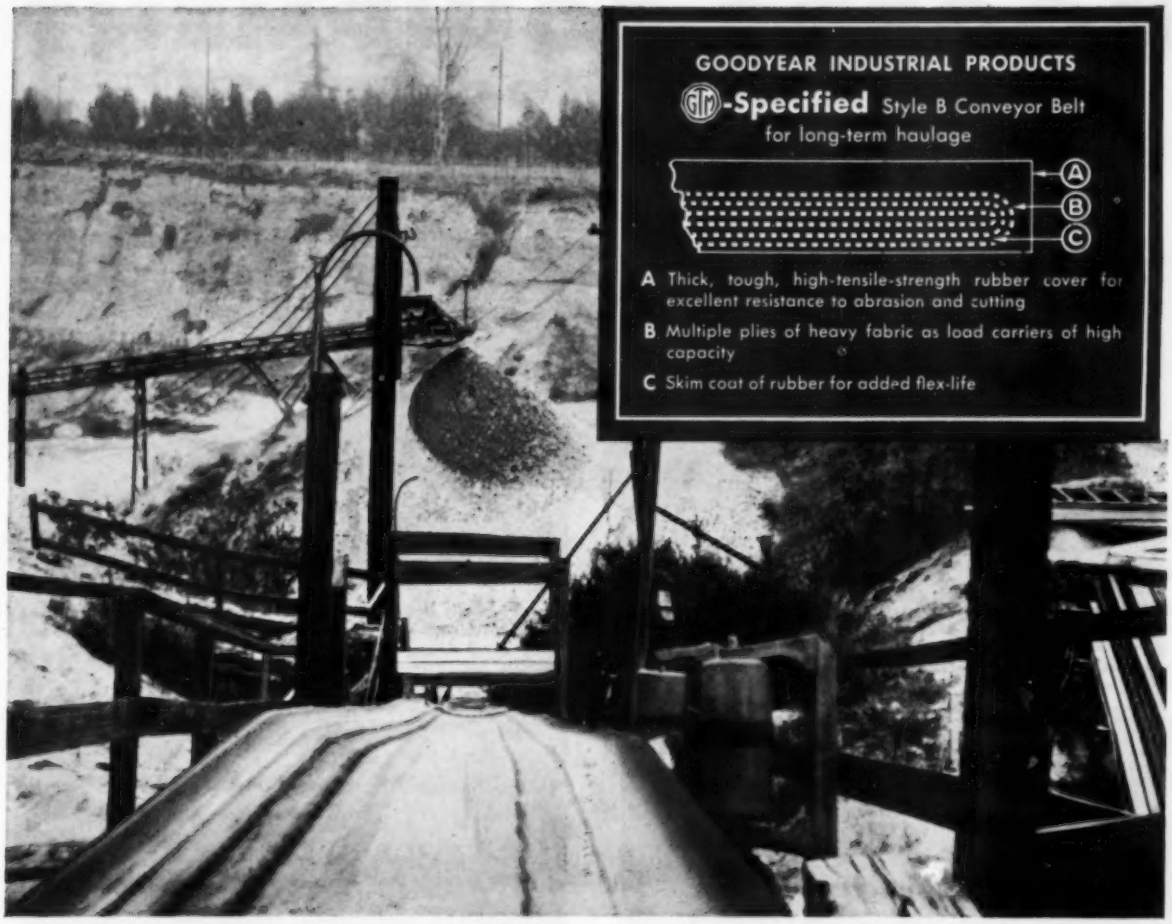
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A
B
C
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Lifting 8-inch rock—at 350 tons an hour—up 125 feet to the crusher-mouth proved a belt-breaking job at this California quarry. Under the great weight, previous belts soon stretched beyond use. All failed in less than 4 years.

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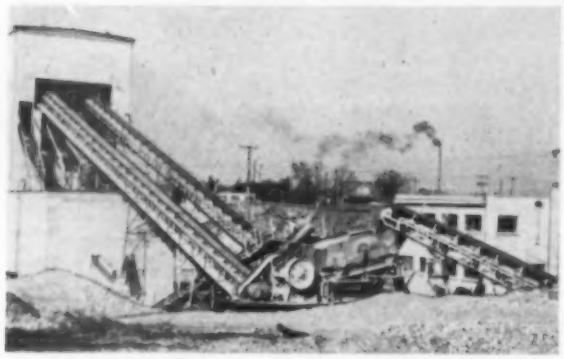
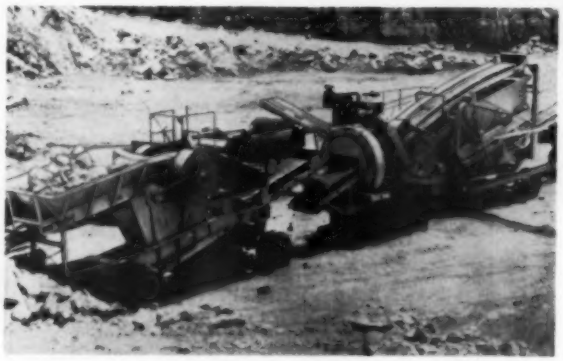
For more than fifty years Rogers has specialized in the quarry, sand and gravel and mining fields. The following Installations illustrate the type of construction and engineering Rogers employs.



Rogers Stationary Sand and Gravel Plant, consisting of heavy duty reciprocating plate feeder, 18" by 36" primary jaw crusher, 42" by 24" secondary roll crusher, 4 vibrating screens, 2 sand screw washers, water scalping tank and necessary conveyors; designed and furnished by Rogers Iron Works.

Rogers Portable Gravel Plant, Monarch Type, equipped with scalping screen, 15" by 36" jaw crusher, 36" diameter by 24" face roll crusher, finish sizing screen, swivel type belt feeder. Rogers also have a complete line of standard straightline gravel plants.

Rogers Stationary Quarry Plant, including skid mounted primary jaw crusher, roll crusher and hammermill, secondary crushers, 2 vibrating sizing screens and necessary conveyors; designed and furnished by Rogers Iron Works.



Rogers Two Unit Portable Quarry Crushing and Screening Plant, primary portable plant furnished with 2436 jaw crusher and 36" by 10' apron feeder, secondary crushing plant, consisting of 36" by 22" roll crusher, 4 by 12 triple deck screen. This unit is also furnished with the same components on two single chassis. Many other sizes available.

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- RECIPROCATING FEEDERS
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- WASHERS
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- LIVE ROLL GRIZZLYS
- UNDERGROUND LOADERS
- ELEVATORS
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- HAMMERMILLS

The demand for a greater volume of aggregates to meet more rigid specifications is increasing rapidly. Rogers Iron Works has endeavored to keep abreast in this field and invites you to let us assist you with your material problems whether it be plant modernization, expansion or complete new installations.

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For information on equipment to meet your requirements, write:

R-109

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IRON WORKS COMPANY
Joplin, Missouri

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SYNTRON SHAKER CONVEYORS

Shown — 50 feet long, 24 inch wide

Shaker Conveyor with extension flare sides

Handle dry or damp, hot, cold or corrosive materials efficiently at high rates

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RP558

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The Editor's Page

Enter Your Industry's Safety Contest Now

THE results of the annual safety contests of the last year for many of the major nonmetallic mineral industries covered by PIT AND QUARRY have been published. The winning companies in some of these contests have already received their awards; others will receive them at the coming national conventions of their industries. Winning such a contest is a great honor, and every member of a winning organization has a right to be proud of such an achievement. However, this honor cannot begin to compare with the other benefits in which all companies participating in these contests share equally with the winners. There is no better way to win the loyalty of your employees and the respect of your community than to show in this manner that you are concerned with their safety, comfort, and welfare.

THE major safety contests in these industries are of several types, and producers in some industries are eligible to enter as many as three or four different ones. The sand and gravel industry has two contests, one conducted by the National Sand and Gravel Association for its members only and one by the U. S. Bureau of Mines for all producers. The crushed stone industry has one contest conducted by the Bureau of Mines and sponsored by the National Crushed Stone Association. This is for member companies only. However, all producers of crushed stone, cement, and lime are eligible to enter a contest conducted by the Bureau of Mines for all mines and quarries.

The lime industry has a contest, conducted by the Bureau of Mines and sponsored by the National Lime Association, which is open to all plants producing commercial lime or dead-burned dolomite. A slag industry contest conducted by the Bureau of Mines and sponsored by the National Slag Association is open to any slag-processing plant. The cement industry has its own contest, conducted by the Portland Cement Association. The National Safety Council also makes awards to member companies in all industries.

Enter one or more of the safety contests for which your company or plant is eligible. There is still time to enter most of them for the current year. In no other way than by showing your interest in the safety of your employees can you do more for their morale. Whether or not you win in these contests, an honest effort will also earn you the good will of neighbors, an important factor in these days of growing zoning problems.

Co-operate in the Sand and Gravel Industry Survey

THE National Sand and Gravel Association has just mailed out to every sand and gravel producer of record in the United States the questionnaire for its annual study of the sand and gravel industry. This will be its fifth such study of the economic contribution which the commercial sand and gravel industry makes to this country. Every producer can help in this very important effort by promptly filling out his questionnaire and returning it to the association.

THIS survey was first started for the primary purpose of providing, soon after the end of each year, information on sand and gravel production for that year which was then not available from any other source in time to be of more than historical value or interest. Another objective was to provide types of information not available elsewhere. The first questionnaire, on 1953 production, was sent to 1,710 sand and gravel companies and returns were received from only 412 companies. In spite of this poor co-operation by the industry, much valuable information was obtained, and the resulting study proved to be invaluable to producers and everyone else interested in the industry.

In the succeeding years this study has continued to prove its value to the industry and to the country and it has been getting increasingly better co-operation from the producers. The questionnaire for 1956 was sent to 1,597 sand and gravel producing companies, and 551 companies, operating 922 plants, replied. This is considerably better than the results in the 1953 survey, but it is still far from being the kind of co-operation such an important service deserves. Partial information was also available from 53 member companies which did not return the questionnaire, making a total of 604 companies which represented the bulk of the commercial sand and gravel production in this country.

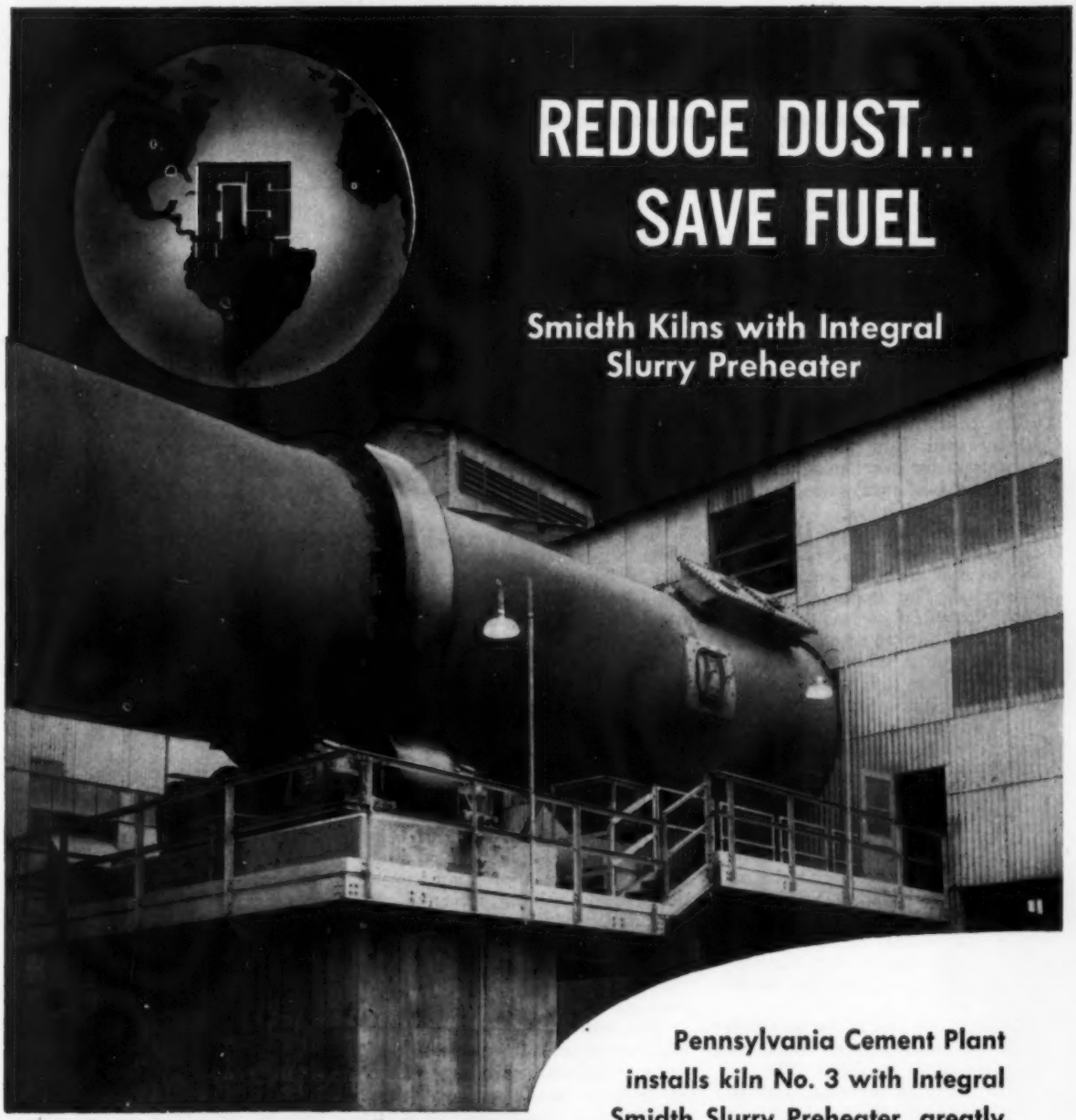
IN the letter accompanying the current questionnaire the N.S.G.A. says: "Your company is an established sand and gravel producer. You have a direct interest in this study. Without your help and the help of other members of the industry, the study cannot be made, your company will not have access to valuable and timely information about the industry in which you are engaged, the whole industry itself will have no reliable data on the scope and proportions of the business which it transacted in 1957, and the country will be deprived of significant economic data about an industry whose product is essential to the great construction program of the United States."

This is an industry study such as is conducted by nearly every other major industry. The individual company reports are used only to arrive at general conclusions and are kept in strictest confidence. And you will get the final report whether you contribute to the data or not. We join the N.S.G.A. in urging you to send in your report as soon as possible. Any company which might for some reason not have received a copy of the questionnaire may obtain one by writing to the National Sand and Gravel Assn., Munsey Building, Washington 4, D. C.

Walter E. Trasoffer

REDUCE DUST... SAVE FUEL

Smidth Kilns with Integral Slurry Preheater



Pennsylvania Cement Plant installs kiln No. 3 with Integral Smidth Slurry Preheater, greatly reducing dust loss and fuel consumption.

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Washington News Letter

By S. HERBERT UNTERBERGER

IN THE opinion of some old timers around Washington, the opening of Congress this year has been characterized by a level of confusion not equaled since the session of 1931. At that time the nation was stunned by the realization that the economy had collapsed. Not only was there no program for overcoming the obvious crisis, but, even worse, the objectives were not clear.

Since those dismal days there has been no lack of crises, but, somehow, none of them has seemed quite so hopeless. The recession of 1938, which dashed many of the hopes built up in the recovery interlude of the preceding years, was a major setback. But the difference was that in 1938 the nation knew what had to be done and set out to do it. It was crystal clear that half-way measures applied stintingly were not going to solve important economic problems.

The entry of the United States into active participation in World War II, which started with the attack upon Pearl Harbor, was a paralyzing event. But here, too, the objective was crystal clear; and the nation went to work with relatively little confusion to attain that objective.

Similarly, the end of the war with its feared re-adjustments came off with very little hardship. The return to a civilian economy, with its heavy emphasis on supplying the goods and services which all of us wanted, was a clear-cut goal; and principally under the leadership of American industry, this goal was met promptly and rather efficiently. Even helping other countries through their reconstruction period was taken in stride.

In these and many smaller crises no fear similar to that which characterized the early 1930's was apparent. This was probably so because they did not involve the necessity for reconsidering standards of value which we had all learned to accept. In the early 1930's, the problem was not only that the economy was shattered, but also the standard of value which placed absolute faith in a completely free enterprise economy was called into serious question.

The crisis of 1958 appears to be of this kind. Confusion appears to be created by the fact that our standards of value again have been brought sharply into question. As a result, no one has a clear-cut goal; and therefore it is virtually impossible to plan a simple program of action.

Fortunately, there is a forum in which the new standards of value will be hammered out. It is called the Congress. It has been a long time since a Congress has been required to reconsider the goal of our American democracy; but the second session of the Eighty-fifth Congress will be required to do just that. And this will be no simple task.

It will involve a great deal more than just deciding how much money should be spent to develop more engineers, physicists, and mathematicians; it will involve a great deal more than just deciding how much money should be appropriated to the development of intercontinental missiles; and it will involve much more than deciding whether the debt limit shall be raised, taxes increased, or the method for aiding farmers or veterans modified.

This session of Congress will probably be required to make the decisions which will determine whether we adopt a simple goal or a more complex one. The simple goal would involve trying to outproduce all potential enemies in the creation and production of engines of mass destruction. The more complex one would envision an attempt to work with, rather than against, these potential enemies, for the purpose of organizing the *earth* into a better place to live in and of planning for the inclusion of outer space in the area for organization.

The former alternative—an epic arms race—requires the least change in our standards of value. Many people, both here in Washington and elsewhere, regard it as the choice least likely to succeed. The second choice would require a very substantial alteration in our standards; but it is probably the only real hope. The fact that there is confusion reflects the more profound fact that this choice is recognized. No one denies that it is a difficult choice to make. It is an interesting fact that neither political party has lined up in favor of one choice or the other.

The life-and-death character of the forthcoming debate appears to be fully recognized. To be sure, the Democrats would be unrealistically generous, if they did not resort frequently to referring to the present crisis as of Republican making. They have not refrained from criticism in the past, and they are unlikely in the future to adopt so high a code. However, it appears there are no more Democrats than Republicans who are ready to proclaim themselves in favor of the more difficult choice and to assume the responsibility for the consequences it would entail.

Nevertheless, the pall that hangs over Washington today results from the realization on the part of the politicians that they will inevitably have to vote for measures which are politically unpopular in their home localities.

At the simplest level, there is not a politician in Washington who thinks it even remotely possible to accomplish a tax reduction either in 1958, or for some years to come. Almost all of them realize that there is almost no alternative to substantial tax increases. It is, of course, possible to avoid this difficult decision by permitting further government borrowing.

Actually, large-scale government borrowing does not involve government borrowing from the citizens directly by selling them large quantities of bonds. To accomplish successful large-scale borrowing, the government has sold the bonds to financial institutions to which it has (generally through the operation of the Federal Reserve Board) supplied the money for buying them.

This is merely an indirect way of increasing the money supply, and a direct way of creating further inflation and a rising price level. When, through its own actions, the

(Continued on page 69)

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long-run power by Allis-Chalmers

If you specify "Allis-Chalmers motors or equal"

. . . remember that the "equal" is possible only in two respects: price and nameplate specifications. You can't match the *long-run power* of Allis-Chalmers motors.

Double-shielded bearings guarded against dirt and over-greasing . . . provision for elimination of moisture condensation . . . practically indestructible rotor design . . . more cooling surface . . . more iron and copper content — these are the features (with others) that make up long-run power. These are the features that give Allis-Chalmers motors "plus" performance that can't be equalled.

Find out more about the motors with long-run power from your A-C representative or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-5663

Power shovel breaks down . . .

So quarry moves boulders with

All over the country, more and more dirtmovers are finding Michigan Tractor Shovels can effectively handle jobs once considered much too tough for rubber-tired equipment.

You've probably read about—or seen—Michigans digging pit-run gravel. Or breaking out reinforced concrete. Or clearing brush. Now here's another dramatic application.

Maintains pit production

The company involved, a large northeastern firm, had always had trouble maintaining pit production when any of their big power shovels broke down. One time this happened, they had a Michigan Tractor Shovel in the pit on demonstration. They decided to put it through the rugged test of rock loading.

Now own six Michigans

That was in 1954. Today, this company owns *six Michigan Tractor Shovels!* In emergencies these units effectively handle both rock loading and cleanup. They also handle *all* truck-loading of screened aggregates and other products of the multi-million-ton crushed stone plant. Management estimates their output "definitely greater" than output of loaders formerly used. Maintenance costs, over periods ranging up to three years, have been "satisfactorily low".

Boulders weigh up to 7 tons each

Note the photos. Above, one of the company's five 2¾ yard Michigan Model 175A's is moving huge boulders to stockpile for later sale as rip-rap. Each chunk weighs ½ to 7 tons . . . yet at no time has operator reported trouble handling them. Upper right, another Model 175A loads shot rock at the quarry face. Michigans' unobstructed dumping height, power shift, and power steer helps speed both emergency assignments.

Load 10 tons in 2 to 3 minutes

Stockpile loading (lower right) keeps the company's

Enter 14 on card, page 101

This is the type of shot rock that must be loaded into trucks for transport to crushers. Michigan Tractor Shovels must be able to take a lot of punishment—and they do!

A full bucket every time saves trips, cuts handling costs of loading crushed stone or sand. This load weighed out at 7,000 lbs. This model Michigan can lift 15,000 lbs.

2¾ yard Michigan

2 yard Model 125A and most of the 2¾ yard Model 175A's busy most of the time. Good mobility and unexcelled breakout, *equally great* through the entire lifting arc, make quick work of this job. The Model 125A needs only 3 minutes to heap a typical 10 yard truck . . . the bigger Model 175A's require only 2 to 2½ minutes.

24 mph travel speeds odd jobs

Michigan speed pays off on odd jobs, too. Like cleanup of haul roads, stockpiles, and around crushers. Pushing loaded trucks up grade. Setting utility poles. Hoisting crusher screens and other heavy equipment. Switching railroad cars (up to 25 empties at once). Plowing and removing snow. Despite year-around work averaging 50 hours a week, company officials report "downtime negligible." And continuing, "The all-Clark-built, all-matched power train sure boosts efficiency. From power shift, power steer and 3-to-1 torque converter to planetary wheel drive axles . . . our '54 model has the same components as our newest rig . . . which certainly proves how good the Clark design is. We like the speed of loading . . . the speed between job sites . . . the excellent performance on emergency rock-handling . . . the lack of downtime . . . the ease of maintenance. That's why we've been repeat-buyers five times!"

Make your own test

A demonstration, gladly arranged by your local Michigan Distributor, will show you why you too should be a Michigan Tractor Shovel buyer. Put the demonstrator on your toughest loading jobs . . . we'll bet *our cost* of the demonstration *against your time* you'll really be *enthusiastic* about the results.

Michigan is a registered trade-mark of

CLARK® EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2479 Pipestone Road
Benton Harbor 42, Michigan
In Canada: Canadian Clark, Ltd., St. Thomas, Ontario

BIG PROJECTS PROVE IT!

Firestones are carrying more loads per dollar!

From the St. Lawrence Seaway to the Priest Rapids Dam in the State of Washington, records prove that Firestone Rock Grip Tires with S/F—safety-fortified—Nylon outwork and outwear them all. Tough cord bodies withstand severest punishment to slash downtime losses. You cut tire costs because two great tread designs match these off-the-highway tires to *any* job. You get the *flotation and traction* you need in loose earth and wet going. You get *armored* protection for hauls over splintered shale and knife-edged rocks. Firestone Tires defy cuts and slugging impacts like no other tires made. Ask your Firestone Sales Engineer about these *tubed* or *tubeless* heavy-duty tires. Call him today at your local Firestone Dealer or Store.

ROCK GRIP WIDE BASE ROCK GRIP

Firestone

BETTER RUBBER FROM START TO FINISH

Enjoy the Voice of Firestone on ABC television every Monday evening.

Copyright 1958, The Firestone Tire & Rubber Company

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Why Wyandotte Chemical Corp. chose this dozer *(a Michigan)*

"Like most quarries, we have a lot of widely-scattered, repetitive jobs to do," writes William Hagen, veteran manager of Wyandotte's big Alpena, Michigan, limestone quarry. "Trouble was, our crawler-dozers just couldn't handle 'em efficiently—moving, as they must over rocky surfaces, at only a couple of miles per hour. And the cost of track maintenance was pretty awful. Major cause of track wear is travel, of course . . . so we tried to limit *both* as much as possible by putting a crawler on each operating level and another on the stockpiles. Didn't help much, though. Breakdowns would still upset our schedules *several days per week*. So we decided to look at some rubber-tire dozers." They tried one type. It was unsatisfactory. Then Wyandotte's local Michigan Distributor, Michigan Machinery & Equipment Co., arranged an on-the-job demonstration.

Makes hour crawler move in 7 minutes

"From the moment our trial Michigan drove off the flatcar, it was *busy*," Hagen continues. "First job on the docket was leveling a dump area on our macadam storage pile. The Model 180 dozed enough area to last an 8-hour shift —in only 28 minutes! Then, because *two* of our crawlers were down for repairs that day, we drove the Michigan a mile to our shovel loading area. *In less than 4 minutes* it was at work, cleaning up ahead of the 6 yard electric shovel and opening the way for trucks. Half an hour later, we moved back to macadam storage —a 3-minute trip this time. One of our crawlers would have taken a whole hour for the 2 mile round trip alone! Later, the Michigan assisted in moving our big quarry shovel; transfer of the power feed cable and area cleanup were handled faster than ever before. We also used the Model 180 Dozer to move drilling machines, air compressors and shanties . . . to strip shallow overburden . . . clean around the surge bin . . . maintain roads . . . and to level the flux stone stockpile. Nowhere in these operations did the Michigan have a bit of trouble. With performance like *this*, we were sold!"

Only 1 repair job in 5,800 hours

Hagen finds their Michigan today does all of these tasks and many more around this 450-acre quarry. The Model 180 actually works 16 hours a day, 7 days per week. Quarry Superintendent B. C. Raymond estimates its tire wear to be *1/6 as costly* as track maintenance on the crawlers. Its mechanical efficiency has been excellent . . . in the past year, it has been down for repairs *only once*. Operators say "Michigan drives like a new car . . . avoids constant jarring of a crawler . . . gets us on the spot *fast* . . . has fine visibility fore and aft. *We like it!*"

Want to move in on bottlenecks too?

We'll bet a Michigan Dozer can break production bottlenecks for *you*, too. Won't cost you a cent to find out—your local Michigan Distributor will be glad to arrange a thorough demonstration. You pick the time. You pick the job. No obligation, of course. And ask him about the popular Clark Lease-Purchase Plan, which lets you put a Michigan to work without investing a penny of capital. Other finance plans available—choose the one you like best!

Michigan is a registered trademark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2479 Pipestone Road,
Benton Harbor 35, Michigan
In Canada: Canadian Clark, Ltd.,
St. Thomas, Ontario

CLARK® EQUIPMENT

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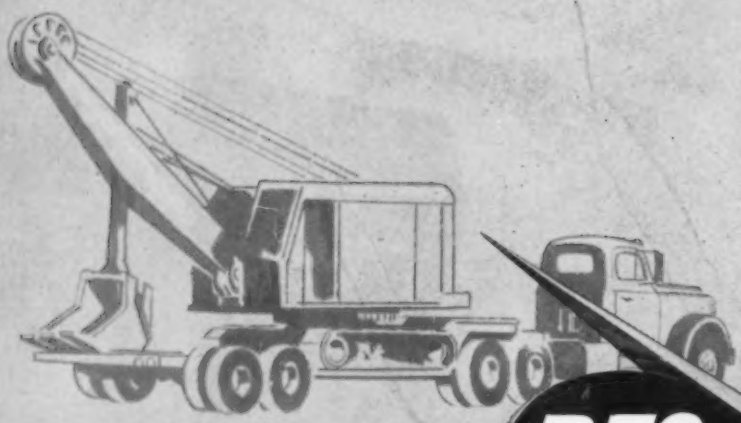
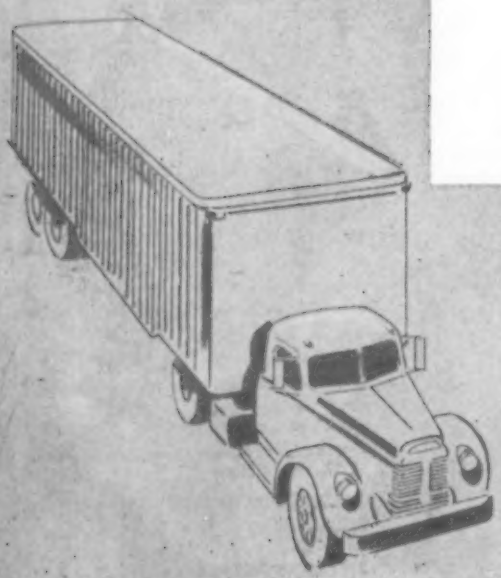


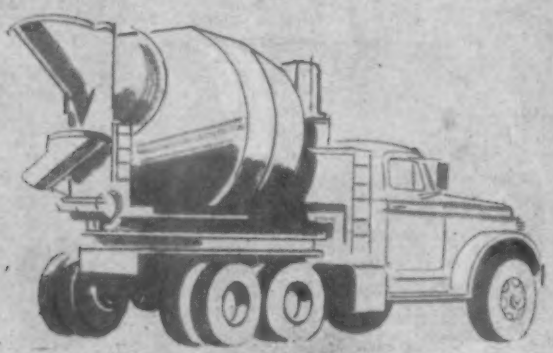
REO

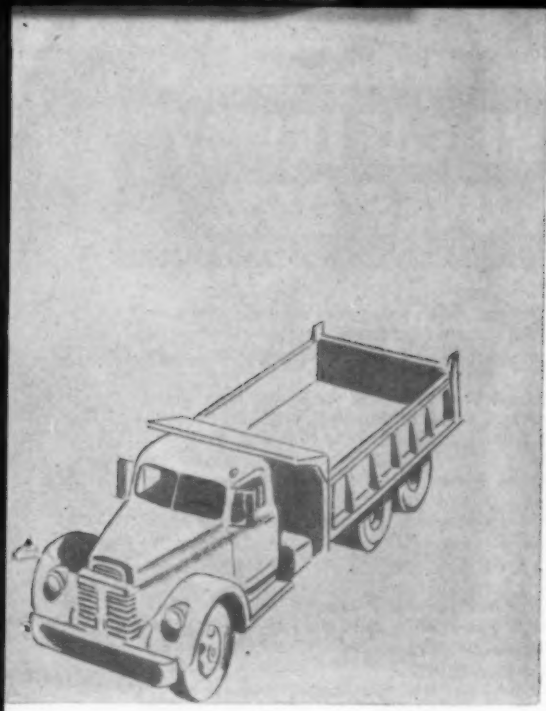
GOLD COMET SIX

beneath

is the heart of the truck!



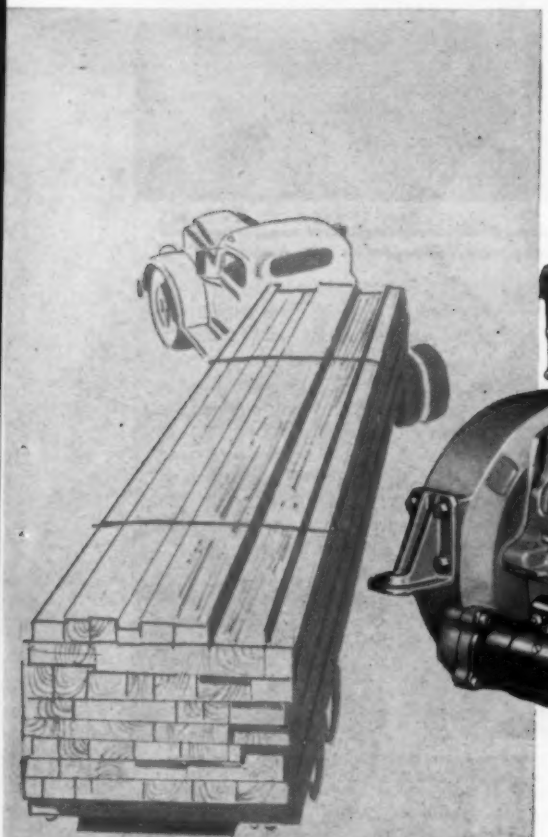




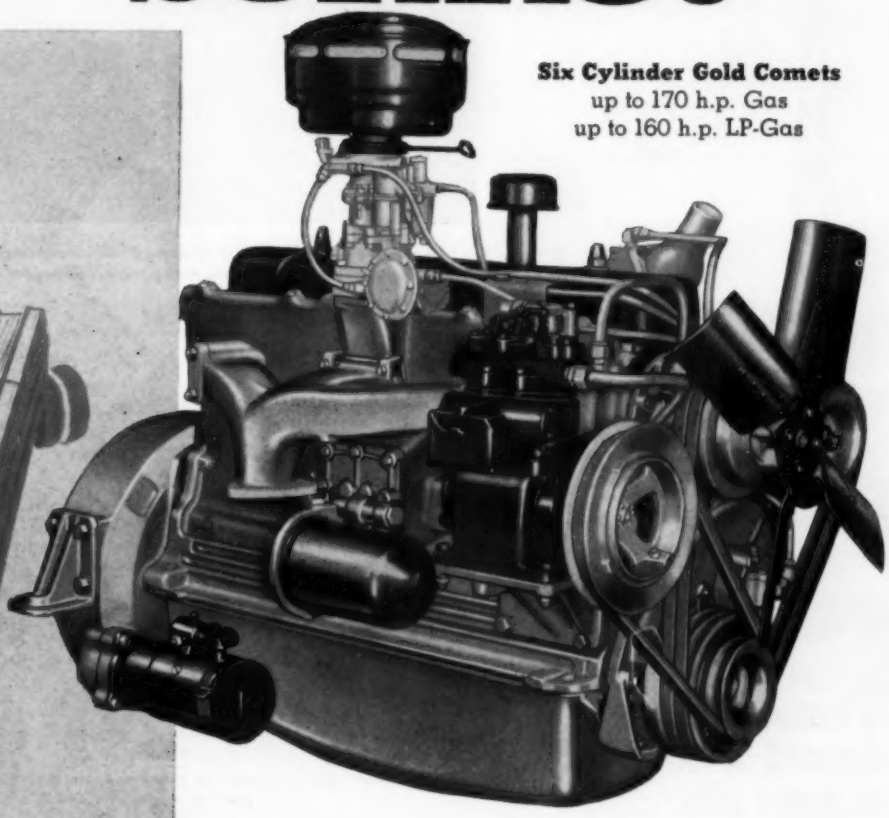
No matter how you slice it—it's power at the wheels that counts. And you get it with a Reo Gold Comet OH-170. This "big-load hustling" engine combines *straight six economy with V-8 responsiveness* to give you the most efficient six cylinder engine in its class. Its "wet-sleeve" design and other advanced Reo exclusive features cut downtime and overhaul costs in half.

For "cost of power to the wheels", there is nothing comparable on the road. And Reo can prove it. So ask your Reo salesman for a demonstration. There's a Reo Gold Comet Six engine for trucks of any make.

the "bonnet"



Six Cylinder Gold Comets
up to 170 h.p. Gas
up to 160 h.p. LP-Gas



REO DIVISION LANSING 20, MICHIGAN
THE WHITE MOTOR COMPANY

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NEW SAUERMAN SLACKLINE CABLEWAY INCREASES PRODUCTION OVER 25%

Bucket breaks water with heaping load from a 100 ft. depth...

Wherever deep digging is required and operating spans are long, the new Sauerman Slackline is adding to its margin of superiority over other types of excavators. Production increases of over 25% and in some unusual cases as high as 80% are reported.

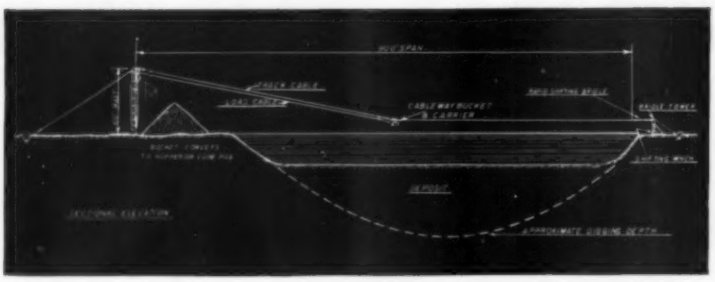
Not only is production increased but operating costs are lowered as cable and hoist wear is reduced and the machine runs with fewer peak loads and shocks—all possible from a cushioned drive using a torque convertor and other refinements.

These benefits are also available to present owners of slackline cableways. Guaranteed Gravel & Sand Co., a Sauerman Slackline user for over 35 years, has increased hoist speeds from 230 to 350 fpm. on the digging cycle and conveying speed to 800 fpm.—a gain of 25%. Guaranteed's 2-cu. yd. bucket is digging 450 ft. away from the surge pile and delivers 150 cu. yds. per hr.

The Sauerman Method lets you work distant material—up to 1,000 ft. away and dig 100 ft. or more below water. Now more than ever the greater tonnage available through fluid drive operation makes a Sauerman Slackline Cableway the low cost way for deep digging.

Get the best machine for your job. Write to Sauerman for expert advice on any materials handling project. For additional information on slackline cableways, ask for Catalog C.

is conveyed and dumped automatically at surge pile.



Above drawing was prepared for a specific slackline installation and does not represent maximum spans. Rapid shifting bridle is not needed for many deposits.

Guaranteed Gravel and Sand Co.'s slackline bucket dumps 150 cu. yds. per hr. on surge pile from digging point 450 ft. away.

SAUERMAN BROS. INC. 634 SOUTH 28TH AVENUE • BELLWOOD, ILLINOIS

CRESCENT SCRAPERS • SLACKLINE and TAUTLINE CABLEWAYS • DUROLITE BLOCKS

Enter 20 on card, page 101

You're looking at a typical example of a Cedarapids Unitized Plant. The photo above shows one of the five different combinations of five Cedarapids units used by one contractor to handle material in three different pits and meet a wide variety of specifications. The five set-ups used on the job are detailed below.

SET-UP 1—As shown above, five Unitized Units were used . . . a Ground-Level Feeder, 2236 Portable Primary, Twin Jaw Scalping Plant, Commander Tandem Plant with pre-screening attachment, and a 4024 Roll Crusher Secondary.

SET-UP 2—Three of the same units used in the first set-up . . . Feeder, Scalper, and Roll Secondary . . . produced 220 tons per hour of minus ¾" material.

SET-UP 3—The Commander Plant with pre-screening attachment, was used alone to produce 170 tons per hour of minus ¾".

SET-UP 4—Operating independently in the same pit as Set-up 2, the Commander and Twin Jaw Scalper with the Roll Secondary Plant averaged 3000 tons of ¾" material in a 9-hour period, which included waiting time for trucks.

SET-UP 5—The Portable Primary and Commander Plant with pre-screening attachment were combined.

How you can meet every aggregate specification with ONE CEDARAPIDS UNITIZED PLANT

So far we haven't found any aggregate specification or volume requirement which cannot be met by one of the many different combinations of Cedarapids units that make up a Cedarapids Unitized Plant!

Unitized is the key word. Cedarapids manufactures every type and size of crushing and screening unit that experience has shown is needed to produce aggregate from any pit or quarry, in any quantity, and meet every specification. This equipment is *Unitized* . . . each unit is matched to every other unit for balanced production. Each unit complements every other in handling efficiently its part of the aggregate processing procedure. These units can be combined in dozens of different ways to meet whatever capacity and finished product demands your job calls for.

Perhaps one Cedarapids unit will do your job . . . maybe you need three, or five, if your capacity requirements run into the thousands of tons per hour, your pit conditions are difficult to crack, or the specifications you have to meet are unusually exacting.

With the big contracts coming up for the Highway Program, we urge you to get the facts about what a Cedarapids Unitized Plant can do for you. Talk to the many big-time operators who use them, then see your Cedarapids Dealer for specific details.

IOWA MANUFACTURING COMPANY

Cedarapids — Built by IOWA

CEDAR RAPIDS, IOWA, U. S. A.

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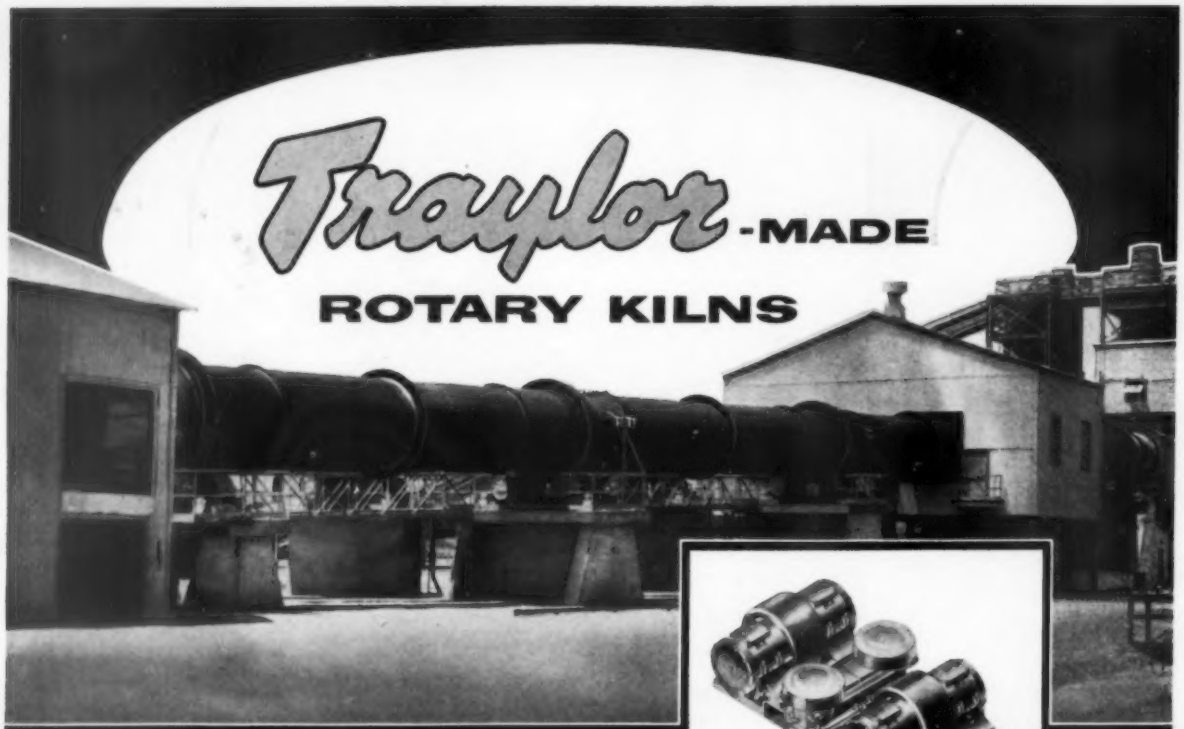
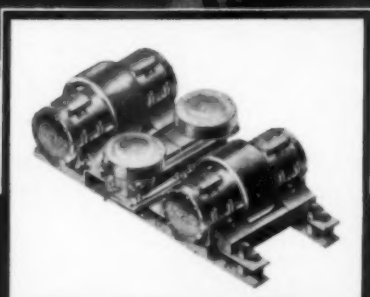
Traylor-MADE ROTARY KILNS

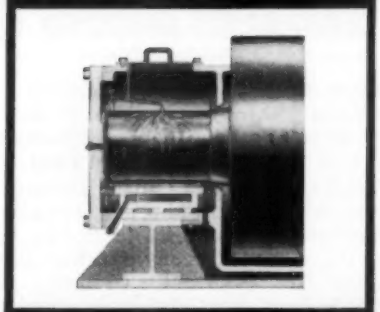


Traylor Rotary Kiln installation in a chemical processing plant.



Standard roller support made with cast steel or forged steel rollers mounted on forged steel shafts.

Traylor engineers have built hundreds of rotary kilns which are now in use throughout the world. Put your thermo-processing machinery problems in the hands of experienced builders — a sure way to guarantee swift and efficient solutions. Write today for bulletin No. 1115.



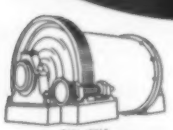
Oil reservoir and oiling mechanism distributing oil over the shaft in a Traylor Single Support Roller Bearing.

Traylor

TRAYLOR ENGINEERING & MFG. CO., 1015 MILL ST., ALLENTOWN, PA.

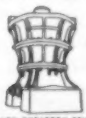
Sales Offices: New York — Chicago — San Francisco

Canadian Mfr.: Canadian Vickers, Ltd., Montreal, P.Q.


BALL MILLS

ROTARY KILNS

APRON FEEDERS


PRIMARY GYRATORY CRUSHERS

JAW CRUSHERS

SECONDARY GYRATORY CRUSHERS

Enter 22 on card, page 101

News of the Industry

Vulcan Materials Company Merges with 2 Concerns—Acquires 7 Other Firms

Vulcan Materials Company has completed the merger of Union Chemical and Materials Corporation of Chicago, Ill., and Lambert Brothers, Inc., of Knoxville, Tenn., with Vulcan and has also acquired seven other corporations.

The seven companies acquired are the following: Rockwood Slag Products, Inc., of Rockwood, Tenn.; Brooks Sand and Gravel Company and Tennessee Equipment Company, both of Kingsport, Tenn.; Asphalt Paving Materials Company, Chattanooga Rock Products Company, Wesco Materials, Inc., and Wesco Contracting Company, all of Chattanooga, Tenn.

Union Chemical and Materials Corporation's aggregate business was conducted by its Consumers Company, Chicago, with operations in Illinois, Indiana, and Wisconsin. Its chemical business was handled by Frontier Chemical Company Division with headquarters in Wichita, Kans., and plants in Wichita; Denver City, Tex.; and Grants, N. M.

Lambert Brothers and most of the seven other corporations acquired dealt in the production and sale of commercial aggregates and related products.

These new facilities will be operated as divisions or subsidiaries of Vulcan, and officers of the acquired operations will continue participating in the management.

Production and sale of commercial aggregates, construction and paving materials in which aggregates are a principal ingredient, concrete pipe and other products, and handling of tin and steel have constituted the principal business of Vulcan. The company also deals in iron blast-furnace slag, gravel, and asphaltic paving mixtures.

Vulcan Materials operations will be conducted through five divisions and seven subsidiaries. These include the Birmingham Slag Division, Frontier Chemical Division, Vulcan Detinning Division, Consumers Company Division, Lambert Division, Chattanooga Rock Products Company, Southern Cen-Vi-Ro Pipe Corporation, Teckote Corporation, Brooks Sand and Gravel Company, Montgomery-Roquemore Gravel Company, Stockbridge Stone Company, and Wesco Materials, Inc.

Now included in the Vulcan sales area are Alabama, Georgia, Mississippi, Florida, New Jersey, Pennsylvania, and Indiana.

Officers of the company are Charles W. Ireland, president and chief executive officer; A. C. Buttfield, chairman of the board; C. A. Barinowski, John M. Lambert, and Harry A. Clark, vice-presidents; Edmund B. England, controller; Richard F. Ray, treasurer and assistant secretary; and Edwin E. Frost, secretary.

Anchor Concrete Products Acquires Haydite Plants Of John H. Black Company

Anchor Concrete Products, Inc., Buffalo, N. Y., has purchased the Haydite operations of the John H. Black Company of Jewittsville, N. Y. Included are extensive shale beds.

Expansion of the Haydite facilities is planned by Anchor officials. The new operation will be known as the Haydite Division of Anchor Concrete.

PHILLIP S. BETTOLI has been named director of research of The Ruberoid Company, New York, N.Y.

Coming Events

February 10-14, 1958—Chicago. 42nd annual convention and exposition, National Sand and Gravel Association. Conrad Hilton Hotel and Coliseum.

February 10-14, 1958—Chicago. 28th annual convention, National Ready Mixed Concrete Association. Conrad Hilton Hotel and Coliseum.

February 10-14, 1958—St. Louis. Committee Week, American Society for Testing Materials. Hotel Statler.

February 10-13, 1958—Dallas, Texas. Annual meeting, Associated General Contractors of America. Hilton-Statler Hotel.

February 11-12, 1958—Chicago. Annual meeting, National Slag Association. Blackstone Hotel.

February 14-15, 1958—Chicago. Annual convention, Expanded Clay and Shale Association. Conrad Hilton Hotel.

February 16-20, 1958—New York. Annual meeting, American Institute of Mining, Metallurgical, and Petroleum Engineers. Statler and Sheraton-McAlpin Hotels.

February 17-19, 1958—Chicago. 41st annual convention, National Crushed Stone Association. Conrad Hilton Hotel.

February 17-20, 1958—Chicago. 38th annual meeting, National Concrete Masonry Association. Sherman Hotel.

February 24-26, 1958—Montebello, Quebec. Ninth annual convention, National Concrete Products Association. Seigniory Club.

February 24-27, 1958—Chicago. Annual meeting, American Concrete Institute. Morrison Hotel.

March 11-16, 1958—New Orleans. 50th annual convention, American Concrete Pipe Association. Roosevelt Hotel.

May 12-14, 1958—Point Clear, Ala. Annual convention, National Lime Association, Grand Hotel.

May 14-16, 1958—Hot Springs, Va. 23rd annual convention, National Industrial Sand Association. The Homestead.

Nov. Home Contracts Rise; Non-residential Decline Levels Overall Total Figure

Contracts for future construction in the United States totalled $2,370,-699,000 in November, 1957, approximately the same as in November, 1956, according to the F. W. Dodge Corporation.

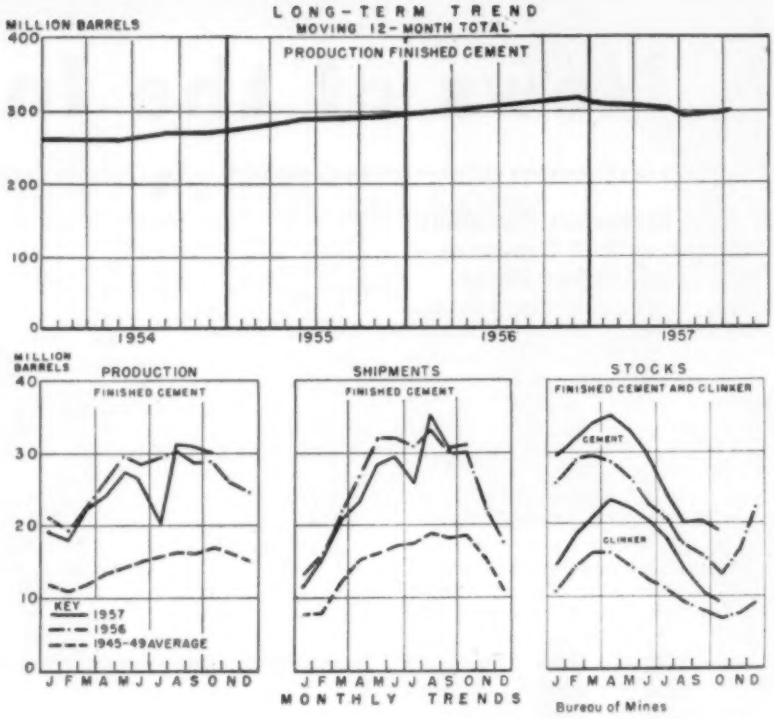
The latest figures compiled by the organization from Dodge Reports and supplementary sources show that November contracts for housing and for heavy engineering rose, but that these gains were approximately offset by a drop in contracts for non-residential buildings. November marked the fifth consecutive month in which residential contracts showed a gain over the corresponding month in 1956.

Contracts for new residential buildings totalled $929,987,000 in November, up 3 percent from November, 1956. The increase was primarily due to a sizable gain in contracts for apartment buildings, aided by a rise in contracts for two-family houses and hotels; single-family homes ran a little behind the 1956 figures. Dwelling units covered by the November contracts numbered 72,147, an increase of 5 percent over November, 1956.

Contracts for non-residential buildings, at $878.484,000, were down 9 percent from November, 1956. Commercial buildings were up slightly, entirely in the office and bank building category; and contracts for hospitals and public buildings rose sharply. All other types of non-residential buildings declined, however, the most notable decline occurring in manufacturing buildings.

Heavy engineering contracts in November amounted to $562,228,-000, up 11 percent from November, 1956. Contracts for airports were down sharply, and highway contracts fell somewhat, but most other heavy engineering categories were well ahead of November, 1956.

Cumulative figures reported by Dodge for the first 11 months of 1957, with the percentage changes from the corresponding period of 1956, are as follows: Non-residential building, $10.594,237,000, up 1.0 percent; residential building, $12,-300,425,000, up 1.0 percent; heavy engineering, $7,316,408,000, up 5 percent; and total contracts, $30,-211,070,000, up 2 percent.



Note: This is a combined report of September and October, 1957, portland cement production.

PRODUCTION—In September, 1957, 163 plants in 37 states and Puerto Rico produced 30,884,000 bbl. of finished portland cement, compared with 28,643,000 bbl. in September, 1956. October figures were: 165 plants producing 30,121,000 bbl., compared with 29,051,000 bbl. a year earlier.

September clinker production was 28,112,000 bbl., compared with 27,324,000 bbl. in September, 1956. In October, 28,758,000 bbl. were produced, against 27,940,000 bbl. in October, 1956.

September high-early-strength portland cement production—773,000 bbl.—decreased 6 percent from September, 1956. The October total was 1,052,000 bbl., up 33 percent from October, 1956.

September production of prepared masonry cement was 1,220,000 bbl., down 6 percent from September, 1956. October output was 1,132,000 bbl., also down 6 percent from October, 1956.

SHIPMENTS—Mill shipments of finished portland cement were as follows: September, 1957—30,511,000 bbl., against 29,935,000 bbl. in September, 1956; October, 1957—30,847,000 bbl., against 31,354,000 bbl. in October, 1956.

In September, shipments were higher in 11 districts and lower in 12 than in 1956. For October, the figures were higher in 10 districts and lower in 13.

Shipments of high-early-strength portland cement were as follows: September, 1957—1,069,000 bbl., against 1,068,000 bbl. one year earlier; October, 1957—1,181,000 bbl., against 1,062,000 bbl., one year earlier, and 11 percent increase.

Shipments of prepared masonry cement showed the following: September, 1957—1,144,000 bbl., down 18 percent from 1,389,000 bbl. a year earlier; October, 1957—1,244,000 bbl. down 6 percent from 1,327,000 bbl. in 1956. (Prepared masonry cements are reported in 376-lb. barrels of varying weights.)

STOCKS—Mill stocks amounted to 20,195,000 bbl. of finished portland cement, September, 1957, up 30 percent over 15,532,000 bbl. a year earlier. Stocks on hand October 31, 1957, were 19,207,000 bbl., up 48 per cent over the 13,007,000 bbl., a year earlier. Clinker stocks were as follows: September 30, 1957—10,808,000 bbl., against 7,969,000 bbl., September 30, 1956; October 31, 1957—9,281,000 bbl., against 6,874,000 bbl., October 31, 1956.

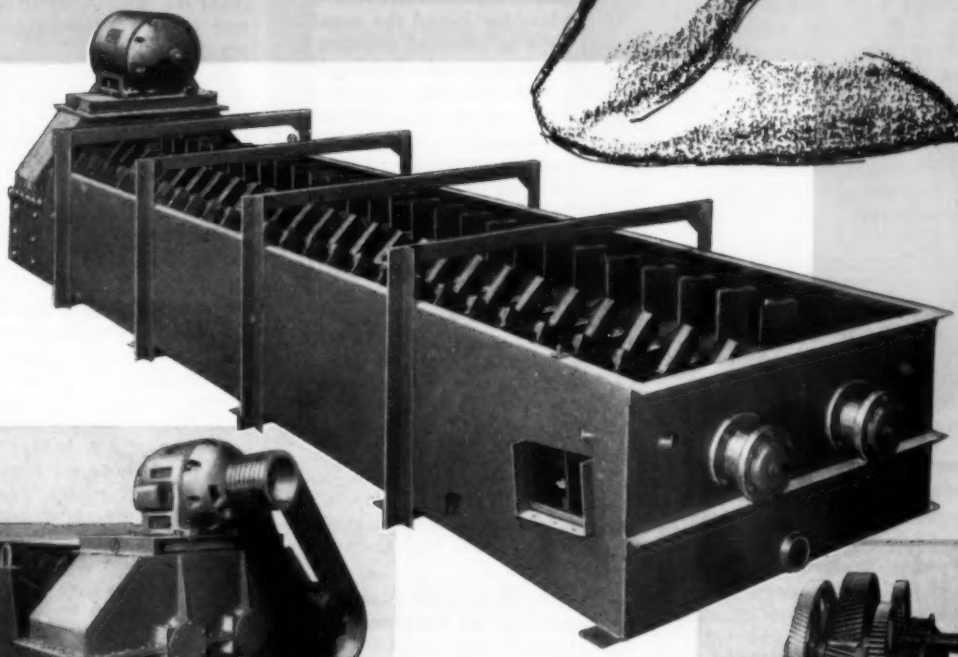
FIRST TEN MONTHS—For the January-October period last year, the volume of production of finished cement amounted to 250,401,000 bbl., compared with 266,162,000 bbl. in the corresponding period in 1956. Total shipments for the first ten months were 251,447,000 bbl.; in 1956, during the same period, total shipments amounted to 268,240,000 bbl.

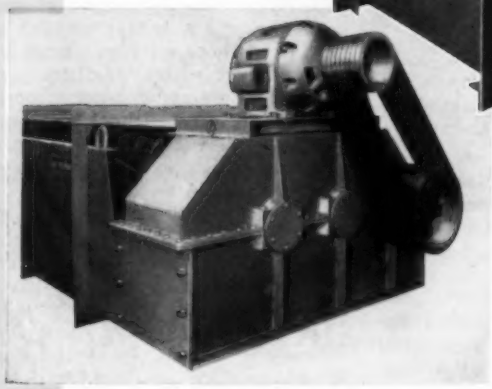
Western Material, Inc., a Kentucky concern, has acquired a 100-acre tract of land near Parsons, Tenn., for the production of agricultural lime and roadbuilding materials. The company will spend $250,000 on the operations and employ about 25 men.

The Federal Reserve System reports that private housing starts in November were maintained at a seasonally adjusted annual rate of 1,000,000 units. Outlays for new construction remained at a seasonally adjusted annual rate of $48,-500,000,000, which was about 4 percent above the average for the year ending June. Construction contracts, which usually decline in the autumn, continued steady in October.

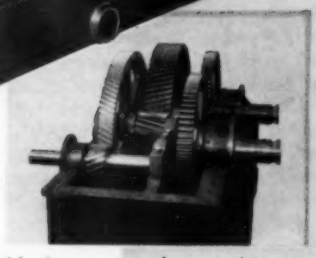
ALL MUSCLE—NO FAT

IN THIS BIG EAGLE LOG WASHER!



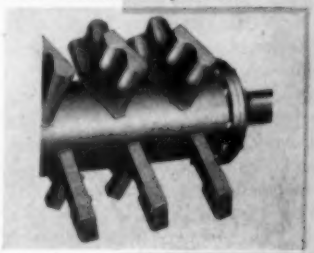


Compound gear drive is sealed against dirt and moisture; runs in oil bath.



Massive compound gear drive assures economical operation.

Every pound of metal that goes into this big Eagle Log Washer has one purpose—to produce cleaner material at greater capacity and make money for its owner. From tip to tip of opposing paddles each log is 36" in dia. Unit will readily handle crushed rock, stone or ore up to 4" dia. Renewable paddle shoes are of wear resistant Ni-Hard chromium-nickel iron alloy. New massive compound gear drive assures smooth operation under severest conditions with minimum power. Hydrotex marine type bearings at lower or tub end are water-lubricated under pressure, eliminating bearing problems. Material is abraded and scrubbed as it is cascaded over and over and comes out sparkling clean—80 to 125 tons per hour. Muscle produces profits for you and there's no fat in this big Eagle. Ask for Information.



Non-deflecting tubular steel log shaft is flanged and is supported by stub shafts at both ends—can be readily lifted out.

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Experience, Progress, Service Since 1872

EAGLE IRON WORKS

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Kinard Named President Of Riverside Cement Co.—Division of Amer. Cement

John M. Kinard has been elected president of Riverside Cement Company, a division of the newly-formed American Cement Corporation.

Other officers of Riverside are R. E. Bouer, vice-president, personnel; A. A. Goethals, vice-president and treasurer; I. C. Smull*, vice-president; H. R. Starke, vice-president and technical director; and L. L. Conley, sales manager.

R. L. Lambert was named comptroller to replace John H. Asmann, who became treasurer for American Cement Corporation upon the recent merger of Peerless and Hercules Cement Corporations with and into Riverside Cement Company. Mr. Asmann will be located in Philadelphia, Pa.

Mr. Kinard joined Riverside in 1950 as an economic adviser to the president. In 1954 he was appointed general manager for the company and in April, 1956, vice-president and general manager.

8 Marquette Plants Scheduled For Production Shut-Downs

Marquette Cement Manufacturing Company, Chicago, Ill., has begun to suspend production at eight of its ten plants for periods ranging up to eight weeks within the first quarter of 1958, company officials announced. Full storages and light demand, which is expected to continue through the next three months, were given as the reasons for the impending shutdowns.

Production was halted first at Marquette's Nashville plant on December 22, 1957, but was resumed on January 6, 1958. Packing, loading, and shipping operations were continued.

The other Marquette plants to be closed temporarily sometime early this year are those located at Brandon, Miss., Rockmart, Ga., Superior, Ohio, Des Moines, Iowa, Cowan, Tenn., and Cape Girardeau, Mo.

The exact periods of shutdown at each location have not been determined, but they will not necessarily be of continuous duration, officials said.

Freeport Sulphur Buys Site For Onshore Operation Base

Freeport Sulphur Company has purchased 50.40 acres in the eastern section of Grand Isle from the Grand Isle Industries, Inc., for a reported price of $151,200.

Freeport intends to develop an onshore base 6 miles from its planned mining operations in the Gulf of Mexico. Included in the plans are a heliport, a small dock, a seaplane ramp, an operations building, a dispatcher's office, and a parking lot.

*See page 88.

Schneider Named Secretary Of Portland Cement Assn.

J. L. Schneider has been appointed secretary of the Portland Cement Association, Chicago.

Mr. Schneider joined the association in 1948 as editorial assistant in the Advertising and Publications Bureau, and became successively publications editor, assistant manager, and manager. He served as manager of the Publications Bureau from 1954 until 1957. In May, 1952, he was named assistant secretary.

Asbestos Research Facility Of ASARCO Nears Completion

A new wing to house the asbestos research laboratory of the American Smelting and Refining Company, New York, N. Y., is nearing completion at the company's Central Research Laboratories in South Plainfield, N. J.

The new wing has 22,500 sq. ft. of space, and will increase ASARCO's already large research facilities by 25 percent.

Bennett to Supervise Plant Of Penn-Dixie at Kingsport

Charles S. Bennett has been named Penn-Dixie Cement Corporation's superintendent of operations at the company's plant in Kingsport, Tenn.

Mr. Bennett has been with Penn-Dixie since 1951, serving as engineer in the company's main plant in Nazareth, Pa., and plant engineer at Clinchfield, Ga.

Charles S. Bennett

Houston Clinton & Company Purchased by T.C.M. Co. Adds 1,500 T.P.D. Output

E. Phil Gemmer, president of the Texas Construction Material Company, a Texas corporation with headquarters in Houston, has announced the purchase of Houston Clinton & Company in Burnet, Tex., for approximately $1,000,000. The plant has a capacity of about 1,500 tons of crushed dolomitic limestone per day.

Ramsey Clinton, son of the founder of Houston Clinton & Company, will be in charge of production at the Burnet plant, which will be known as Burnet Stone Division, Texas Construction Material Company. T.C.M. as the parent company is commonly called, anticipates making no personnel changes in the new operation. Robert T. Woodliff will become assistant to Mr. Clinton.

T.C.M., a leading producer of top quality sand and gravel, was organized in 1929. In addition to its concrete, sand, and gravel business, T.C.M. is also a producer of such related products as blasting sand, oil well fracturing sand, filter media, and asphaltic aggregates. With the addition of the Burnet plant and continuation of the current operations, T.C.M. will add large quantities of crushed dolomitic limestone to its line of products.

Houston headquarters house the executive, sales traffic, purchasing, and accounting departments. Production headquarters are at Alleyton —three miles southeast of Columbus. The Colorado County plant locations, one each at Helms and Eagle Lake, produce concrete, sand, and gravel. Other major plant areas are at Romayor, which primarily produces blasting and concrete sands, and at Corrigan, where oil well fracturing sand is processed.

W. C. Slee Named Director Of N. J. Crushed Stone Assn.

Spokesmen for the New Jersey Crushed Stone Association, Inc., Trenton, N. J., announced the appointment of William C. Slee as managing director.

Mr. Slee has served as assistant engineer-director of the American Road Builders Association, field engineer for the Portland Cement Association, and most recently, chief engineer of the Sales Division of the Robinson Clay Product Company, Inc., Akron, Ohio. During these various assignments Mr. Slee worked with the representatives of various federal, state, and local governments, architects, and consulting engineers.

Albert R. Couchman

A. R. Couchman Dies at 63— N. American Cement Veteran

Albert R. Couchman, 63, assistant to the operating vice-president and general purchasing agent of the North American Cement Corporation, New York, N. Y., died unexpectedly at St. Francis Hospital in Miami Beach, Fla.

Mr. Couchman had been associated with North American Cement for the last 42 years, successively filling positions as plant superintendent, safety manager, assistant sales manager, and traffic manager before assuming his latest position.

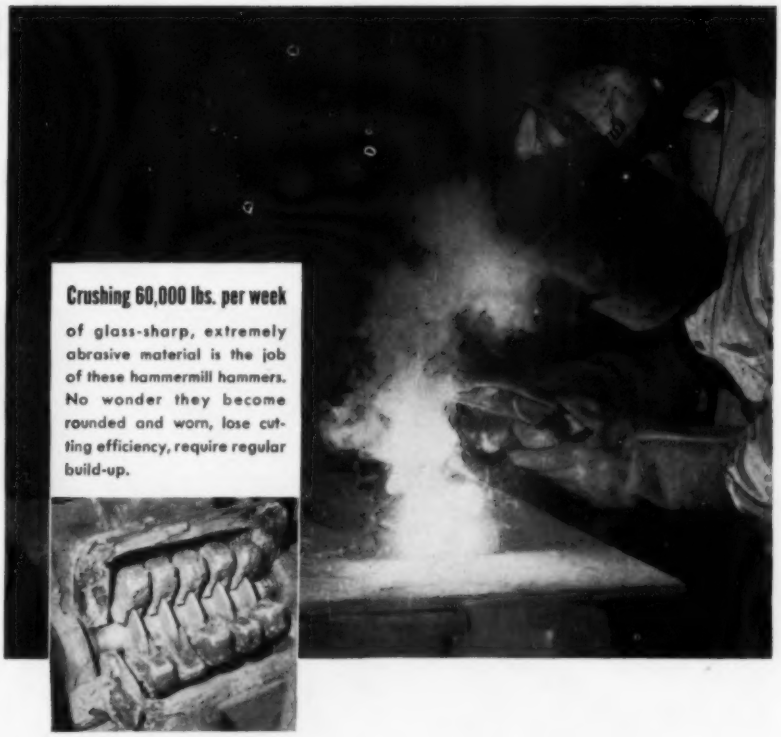
Big Boom at Little Valley Blasts Off 3,000,000 Cu. Yd.

At Little Valley, Utah, where the Morrison-Knudsen Construction Company is handling a $49,000,000 job of producing fill material for the new Great Salt Lake causeway, a blasting operation recently tore off more than 3,000,000 cu. ft. of rock from a cliff 300 ft. high.

Described as "the world's largest non-atomic explosion," the detonation required 2,138,000 lb. of dynamite and nitrate fertilizer, placed in tunnels deep within the rock.

J. R. LeGrand has been named assistant production manager of the Consolidated Feldspar Department, Industrial Minerals Division, by International Minerals and Chemical Corporation, Chicago, Ill. He was formerly superintendent of the company's mica plant at Erwin, Tenn.

The annual meeting of the Empire State Sand, Gravel and Ready Mix Association will be held May 11, 12, and 13 at the Syracuse Hotel, Syracuse, N Y.


Crushing 60,000 lbs. per week
of glass-sharp, extremely abrasive material is the job of these hammermill hammers. No wonder they become rounded and worn, lose cutting efficiency, require regular build-up.

HARDFACING WITH AMSCO 20

doubles service life . . . cuts electrode costs

Welding Flux Processing, Chicago Heights, Illinois, know a good thing when they see one. That's why they've switched *exclusively* to Amsco 20 electrodes for hardfacing of these hammers. They're saving three ways:

1. Service life of the built-up hammers and the mill housing itself has been doubled, because of Amsco 20's high abrasion resistance.
2. Amsco 20 electrodes cost about 40% less than the type previously used.
3. Welding speed is stepped up. Amsco 20, an iron powder "contact" electrode, is easy to handle and gives a high deposition rate.

In this and many other severely abrasive applications, Amsco 20 has *proved* its ability to provide superior wear resistance at low cost. Available from stock in 3/16" diameter, to handle hardfacing jobs of almost any size.

Call your nearby Amsco Welding Distributor now, for a demonstration of Amsco 20. Or write direct for technical data to: Amsco Welding Department, Chicago Heights, Illinois.

American Brake Shoe Company

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OTHER PLANTS IN: DENVER LOS ANGELES, NEW CASTLE, DEL., OAKLAND, CAL., ST. LOUIS, JOLIETTE, QUEBEC

Enter 27 on card, page 101

SPEED....POWER.... GARDNER-DENVER

A 5½" hammer wallop. Here's deep hole drilling power in a class by itself. Gardner-Denver DH143 fills the rock drill gap between wagon drill and rotary rig.

Enter 28 on card, page 101

DEEP HOLE PUNCH BLAST HOLE DRILLS

New mobility in an old quarry favorite. This new deluxe model of "Air Trac"® provides complete power positioning for all vertical, horizontal and flat lifter holes from centralized controls.

Lightweight combination. Easily handled drilling power for fast, clean holes with Gardner-Denver FL48 and FL58 air feed leg drills.

In-the-hole power for rotary rigs. New, hard-hitting Gardner-Denver "Mole-Dril"* rides with bit through rock, delivers more foot-pounds of energy to the bit than any other drill of its size.

*Trade-Mark

Air power for all drills. And plenty of it when you put water-cooled, all-weather Gardner-Denver rotary portables on the job. Five models from 125 to 900 cfm.

See these Gardner-Denver products at the National Crushed Stone Show, February 16-19, at the Conrad Hilton Hotel in Chicago.

LOOK FOR BOOTH 45

ENGINEERING FORESIGHT—PROVED ON THE JOB
IN GENERAL INDUSTRY, CONSTRUCTION, PETROLEUM AND MINING

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

Wright of Ash Grove Lime Retires after 40 Years—Barber, Willis Promoted

Kenneth W. Wright, superintendent of the Ash Grove Lime and Portland Cement Company's plant in Chanute, Kans., has retired after 40 years of service, the last 12 in the superintendent's position. He joined the company in 1917 as a draftsman in the engineering department.

Taking over Mr. Wright's duties will be Ira E. Barber, who joined Ash Grove as a draftsman in 1922. He has been assistant superintendent since 1945, co-ordinating recent plant expansion, production, and personnel placement.

Richard E. Willis succeeds Mr. Barber as assistant superintendent. He has been plant engineer since joining the firm in 1954, supervising machinery installations and helping develop greater efficiency in handling materials.

Left to right: Kenneth W. Wright, Ira E. Barber, and Richard E. Willis.

Allentown Portland Cement Ends $1,750,000 Expansion

Allentown Portland Cement Company recently completed a $1,750,000 improvement program at its plant in Evansville, Pa.

Improvements included construction of facilities for raw materials, handling, and grinding, and provision of space for future expansion of the kiln department. This modernization project is part of a $5,000,000 reconstruction plan started at the close of World War II.

E. P. Sellner Appointed Head Of P.C.A. Conservation Work

The appointment of E. P. Sellner as manager of the Conservation Bureau, Portland Cement Association, was announced recently. He succeeds Ezra Wenger, who retired after 24 years with the association.

Mr. Sellner has been with P.C.A. since 1955. He had previously been affiliated with the United States Health Service and the Institute of Inter-American Affairs in engineering capacities. In the latter post he served in Brazil. He also has been a member of the faculties of the University of Oklahoma, the University of Kansas, and the Agricultural and Mechanical College of Texas.

Williamson Cascade Pumice Sold to Boise Cascade Corp.

Williamson Cascade Pumice Company of Bend, Oreg., has been sold to the Boise Cascade Corporation, Boise, Idaho, in an undisclosed cash transaction, according to Lloyd A. Williamson, president of the former firm.

The sale included 3,000 acres of owned or leased land rich in pumice and volcanic deposits, two processing plants, and all of the appurtenances of the open pit mining, distributing, and selling of natural aggregates.

The purchased company will be known as the Cascade Pumice Corporation, with Mr. Williamson serving as president and general manager. Ralph H. Young of Seattle, Wash., joined the firm on January 1, 1958, as sales manager. No change will be made in the operation of the business or in personnel.

The purchasing corporation, Boise Cascade, while principally interested in lumber, owns several concrete products and ready-mixed concrete firms.

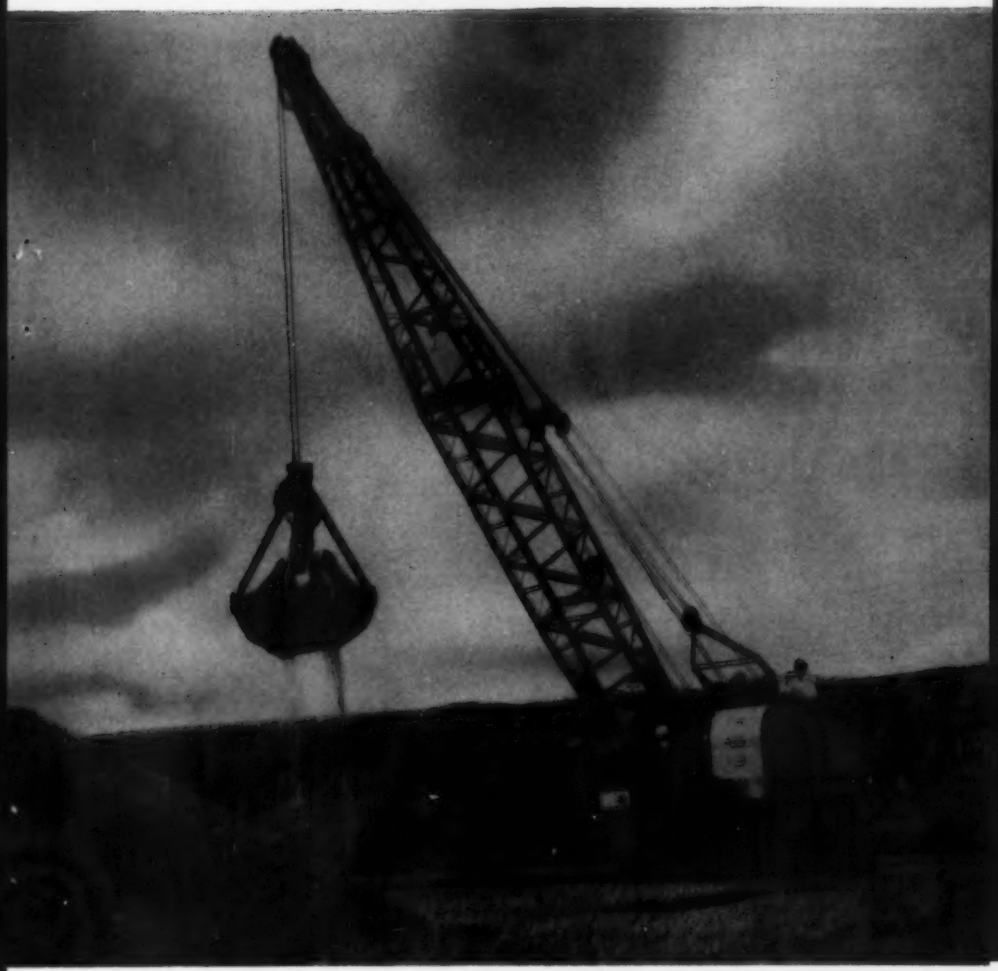
Mr. Williamson came to Bend in 1946, building his first plant near Tumalo near his pumice deposits, the second in Deschutes in 1948, and the third in the industrial district of Bend in 1955.

The Ideal Cement Company, Denver, Colo., reported that its net income for the three quarters ended September 30, 1957, totaled $10,292,433 or $2.95 a share, compared with $11,401,294 and $3.47 of the previous year. 1957 and 1956 net sales were $60,538,685 and $59,630,511, respectively.

The North American Cement Company's Cementon plant, Catskill, N. Y., has completed 1,000 days of operation without a lost-time accident. Plant employees number 245 workers.

• New York Trap Rock's new administration building was recently constructed at West Nyack, N. Y., to house the firm's executive offices. Over 2,500 employees and guests inspected the building and attended dedication ceremonies during a special three-day program held in mid-December. The H-shaped building, built of a brick exterior and slate roof, provides approximately 14,000 sq. ft. of floor space.

for aggregate handling, use orton experience



Famous **orton** *power is not in durability alone*

ORTON cranes have long been famous for durability; ORTON steam cranes are still in use; ORTON users are reluctant to part with rugged, easy-to-maintain ORTON work horses.

But this is not the most important ingredient you buy with an ORTON. You get the benefit of more than 50 years experience, *applied*—TO—*YOUR*—CRANE!

EXPERIENCE means a great deal . . . especially at ORTON where "production-line" manufacture is maintained only so long as the cranes on the line are engineered to the latest, *proved* design for *your* job. For, since Orton can't build *all* the cranes, it builds only the best.

ORTON, *first* with *Torque-Control*, *first* with air-operated controls, *first* to apply new techniques *which have been proved*, is also the *first* to recognize that *each handling job is unique*, thus, an ORTON crane is built for *you*—*your* job—*your* specification.

Consider ORTON first—it *is* first.

***EVERY* ORTON CRANE has:**

. . . ALL power shafts carried on sealed anti-friction bearings—NO exceptions.
. . . ALL motion entirely independent.
. . . NO jaw clutches—not even in travel mechanism.

orton CRANE & SHOVEL CO.
CHICAGO, ILLINOIS

THE MOST POWERFUL NAME IN CRANES

Enter 31 on card, page 101

Cooley Gravel Company's plant floating across a street at its location near Denver. The $7,000 moving job involved a voyage of 70 seconds' duration. Note the side delivery stacker conveyor belt, extending 150 ft. from the side of the plant.

Cooley Gravel Company Relocated In $7,000 Plant Moving Job

AN UNUSUAL moving job recently took a floating gravel plant, operated by the Cooley Gravel Company of Denver, Colo., across the street by water at a cost of about $7,000. The move (actual travel time) required approximately 70 seconds.

When this firm secured its original permit (in 1951) to operate a sand-and-gravel plant west of Lowell Boulevard, it was indicated to county commissioners that a change of location would eventually become necessary. Authorities therefore issued a permit recently for the move, specifying that the operation must be carried out on Saturday and Sunday and that the roadway was to be restored to its former condition, or better.

Involved in the project was the removal of a 12-circuit telephone line and the erection of three 75-ft. high-power poles to elevate a 13,200-v. power line. The cut which was excavated for the passage of the plant was 90 ft. wide by 9 ft. deep. Excavation was begun on Friday evening, December 13, and by the following Sunday evening the gap had been closed and the gravel and earth roadway had been packed, ready for traffic.

Only about 3½ ft. of water is required to float the big pontoon hull of the 300-ton plant, which measures 57 ft. by 73 ft. Maximum capacity of the plant is about 250 t.p.h. of washed sand and gravel, which is used locally. Some gold is also recovered, valued at about 5 cents per ton of sand and gravel — approximately enough to pay the plant power costs.

Since some of the area from which material was removed was swampy and unsuitable for construction purposes, the overburden was replaced in such a way that building sites can be created, and recreational possibilities are anticipated. It is estimated that Cooley will continue its operations at the new site for five or six years.

Staff members in charge of the moving operation were Gene Wemlinger, Orville Enderud, and Jim Cooley. C. G. Cooley is president and general manager of the firm.

The Permanente Cement Company will handle the Permanente Steamship Corporation's ships in the future when they are in the Seattle (Wash.) area. For the last 10 years the agency was handled by the Olympic Steamship Company.

This view shows the 90-ft. cut made across the roadway to permit the plant to move to its new location.

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Rock Service
TUBELESS
Turn this page for
big news about
the most advanced
off-the-road tire
on the market today!

NEWEST, BIGGEST OFF-THE-ROAD TIRE FROM

B.F.Goodrich

NEW ROCK SERVICE TUBELESS PREVENTS UNNECESSARY TIRE FAILURES

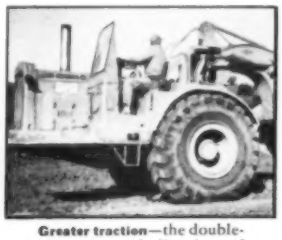
THE new B.F.Goodrich Rock Service Tubeless tire for mining, quarrying and dirt-moving jobs eliminates the major cause of tire trouble and expense! Unlike ordinary tires, the Rock Service is *built to its inflated shape.* This FLEX-RITE construction permits *even* flexing. No localized stresses that often cause unnecessary tire failures.

The Rock Service is built with FLEX-RITE NYLON cords that withstand double the impact of ordinary cord materials, resist heat blowouts and flex breaks. Result: more retreadable Rock Service tires. Double-chevron cleats give maximum traction and skid resistance in forward or reverse. Sidewalls defy bruises, grooves expel stones.

B.F.Goodrich Tubeless construction runs cooler, protects against punctures, cuts maintenance costs, is easier to service.

See the Rock Service Tubeless (or tube-type)—the most advanced off-the-road tire on the market today—at your B.F.Goodrich dealer's. *B.F.Goodrich Tire Co., A Division of The B.F.Goodrich Co., Akron 18, Ohio.*

No unnecessary failures thanks to bruise-resistant tread and sidewalls, uniform flexing, cooler-running tubeless construction.



Greater traction—the double-chevron tread digs in and pulls in forward or reverse. Sharp cleat angles defy dangerous skids.

FLEX-RITE construction means the Rock Service is not distorted when inflated. No tire-killing stresses. Instead, uniform flexing.

More retreads, because FLEX-RITE NYLON cords withstand double the impact of other materials, resist heat blowouts, flex breaks.

Specify **B.F.Goodrich tires when ordering new equipment**

Smileage

Your B.F.Goodrich dealer is listed under Tires in the Yellow Pages of your phone book

Woodville Lime Executive Named General Manager—Plant to Be Modernized

John J. Urschel, assistant to the president of the Woodville Lime Products Co., Toledo, Ohio, has been

John J. Urschel

assigned additional duties as general sales manager of the firm's building products division.

He will supervise sales activities among Woodville's representatives, distributors, and dealers in the eastern half of the United States and Canada.

Through its vice-president in charge of production, George C.

George C. Urschel

Urschel Jr., Woodville also announced that it is engaged in an extensive modernizing program, which will continue through much of 1958. New equipment is being added, and plant facilities are undergoing changes designed to step up quality and efficiency.

The company markets a complete line of building, agricultural, and industrial lime products under the Blubag label. Established in 1902, with plant and quarries at Woodville, Ohio, it is reportedly one of the largest independent lime manufacturers in the world.

Modern Plant to Replace West Nyack Facilities Of New York Trap Rock

An entirely new crushing plant equipped with modern dust collectors will replace the New York Trap Rock Corporation's present quarry-plant at West Nyack, N. Y. early this spring. Construction has already begun on a 7-acre tract.

Jaw and gyratory type crushers and three dust-collecting units consisting of 1,500 tubes will be installed.

Milling and crushing operations will function within three main buildings, two transfer houses, and two towers, linked by conveyors. All buildings will have reinforced concrete foundations and floors, structural steel framing, and metal walls and roofs. An underground reinforced concrete tunnel will contain a conveyor to carry rock materials from a storage pile of partially processed stone to the final crushing and screening operations.

National Safety Council Offers Training Courses

The National Safety Council has scheduled two weekly Safety Management Techniques training courses for safety men, from February 24 to 28 and May 19 to 23.

Safety Management Techniques is for qualified safety men, and is calculated to improve their skills in communication, human relations, and safety program planning.

The courses are open to safety men whose experience and knowledge make it unnecessary for them to take a preliminary course on fundamentals of industrial safety. Graduates of that course also are eligible.

Additional information on enrollment may be obtained from the Director of Industrial Training, National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Illinois Brick Co. Purchases Western Brick for $1,500,000

Illinois Brick Company, Chicago, Ill., recently bought the Western Brick Company, Danville, Ill., in a $1,500,000 cash transaction.

While holding a minority interest in the Danville firm, Illinois Brick formerly acted as its Chicago distributor. The purchase will provide the company with an expanded sales territory in southern Illinois.

I. R. Cline will continue as president of Western Brick, and other officers have also been retained in the business.

Western Brick, which manufactures shale face brick and Haydite aggregate, a lightweight cement product, does an annual business of approximately $2,500,000.

Beckett, Russell, MacBride Head American Cement Corp.

Officers of the newly formed American Cement Corporation are as follows:

Chairman of the board of directors, Garner A. Beckett; vice-chairman of the board and chairman of the executive committee, W. C. Russell; president, D. S. MacBride; vice-presidents—A. C. Eichenlaub, J. P. Giles, A. A. Goethals, Griffith Henshaw, J. M. Kinard, L. F. Lawler, and Paul J. Rutan; vice-president and secretary, R. J. Morrison; treasurer and assistant secretary, J. H. Asmann.

Hercules Cement Company, Peerless Cement Company, and Riverside Cement Company, which merged to form the new concern, will be operated essentially as independent units. They are now divisions of American.

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Rikard Named President, Cabaniss, Board Chairman Of Southern Cement Co.

A series of executive advancements was announced at Birmingham, Ala., by the Southern Cement Company, a division of American-Marietta Company.

W. J. Cabaniss, former company president, who has been associated with Southern since 1935, has become chairman of the board. He has been succeded by M. A. Rikard. Mr. Cabaniss is chief executive officer of the 57-year-old company, which manufactures Magnolia brand portland cement, as well as specialty cements and lime products.

Mr. Rikard, previously vice- president in charge of operations, has been with the firm since 1941. He is currently serving his second term as president of the National Lime Association.

Under the direction of Mr. Cabaniss Southern has greatly enlarged its production and sales in recent years. Expansion in 1957 included new facilities that increased the company's portland cement capacity by 1,500,000 bbl. annually.

C. H. Ellison Jr. was named executive vice-president. He joined Southern Cement in a sales capacity in 1933, was made general sales manager in 1952, and vice-president in charge of sales in 1954.

Cement Production in Iraq Totalled 489,400 Tons in '56

The total production of cement in Iraq in 1956 was estimated at 489,400 metric tons.

Output of the government-owned Sarchinar cement plant, which opened in July, 1957, was estimated at 32,000 tons. This new plant, the fourth in the country, has increased Iraq's total cement output to 2,425 tons a day.

In 1955 the Iraq Cement Company, Ltd., produced 316,748 tons; no statistics were available on the output of the Rafidain Cement Company, which began operations late in 1955.

September Lime Sales Dip— October Shows Recovery

Domestic sales of open-market lime last September (755,543 short tons) declined from the August total (858,602 short tons) according to reports submitted to the U. S. Bureau of Mines. Although agricultural lime totals rose, building, chemical, and refractory all declined from the August sales totals.

Domestic sales last October (761,998 short tons) increased over the September output. Building and refractory lime increased, whereas decreases were noted in chemical and other industrial uses and agricultural lime.

The accompanying table shows sales by types and major uses for the two months and the January-October period in 1956 and 1957.

Lime Sold by Producers[1] in the United States, in Specified Periods of 1956-57, by Types and Major Uses, in Short Tons

	September	October		January-October	
	1957	1957	1956	1957	1956
By types:					
Quicklime	587,036	595,343	688,565	6,057,943	5,988,814
Hydrated lime	168,507	166,655	162,793	1,591,880	1,626,376
Total lime[2]	755,543	761,998	851,358	7,649,823	7,615,190
By uses:					
Agricultural:					
Quicklime	12,073	10,264	4,334	68,587	74,224
Hydrated lime	10,140	9,074	7,926	124,791	128,707
Total	22,213	19,338	12,260	193,378	202,931
Building:					
Quicklime	10,562	12,473	12,427	150,895	134,520
Hydrated lime	78,067	83,751	84,422	773,988	840,937
Total	88,629	96,224	96,849	924,883	975,457
Chemical and other industrial:					
Quicklime	388,344	390,856	438,580	3,863,547	3,871,531
Hydrated lime	80,300	73,830	70,445	693,101	656,732
Total	468,644	464,686	509,025	4,556,648	4,528,263
Refractory (dead-burned dolomite)	176,057	181,750	233,224	1,974,914	1,908,539

[1] Also includes a small quantity of captive tonnage. The monthly canvass excludes the output of plants producing less than 10,000 tons a year.

[2] Approximately 60 percent of lime produced is high-calcium and 40 percent high-magnesium.

Testing Laboratory Opened By Caterpillar in Peoria For Metallurgical Control

One of the world's most modern facilities of its type, the new Metallurgical and Materials Testing Laboratory of the Caterpillar Tractor Company was built to insure that all materials used in the manufacture of Caterpillar machines are rigidly controlled throughout all stages of manufacture, and to develop new metallurgical practices and methods of evaluation.

The laboratory, located in Peoria, Ill., occupies 22,000 sq. ft. of laboratory and office space, and the staff numbers more than 150 persons. Designed to provide for future expansion, the new facility has been planned to permit equipment to be added as it becomes necessary.

It is functional in design, featuring removable steel wall panels, unitized cabinet work area with stainless steel tops for ease of maintenance, air conditioning and weather control throughout, sound-proof fiber glass drop ceilings, indirect lighting, quarry stone flooring in the chemical testing area, and the latest safety devices to protect personnel and equipment.

The laboratory tests samples of all materials used in the building of Caterpillar products. These include forgings, castings, bar stock, tubing, bronze, aluminum, brass, rubber, cork, plastics, paints, oils, solvents, chemicals, and fibers. Tests are also run on structural steel and concrete used in building plant facilities.

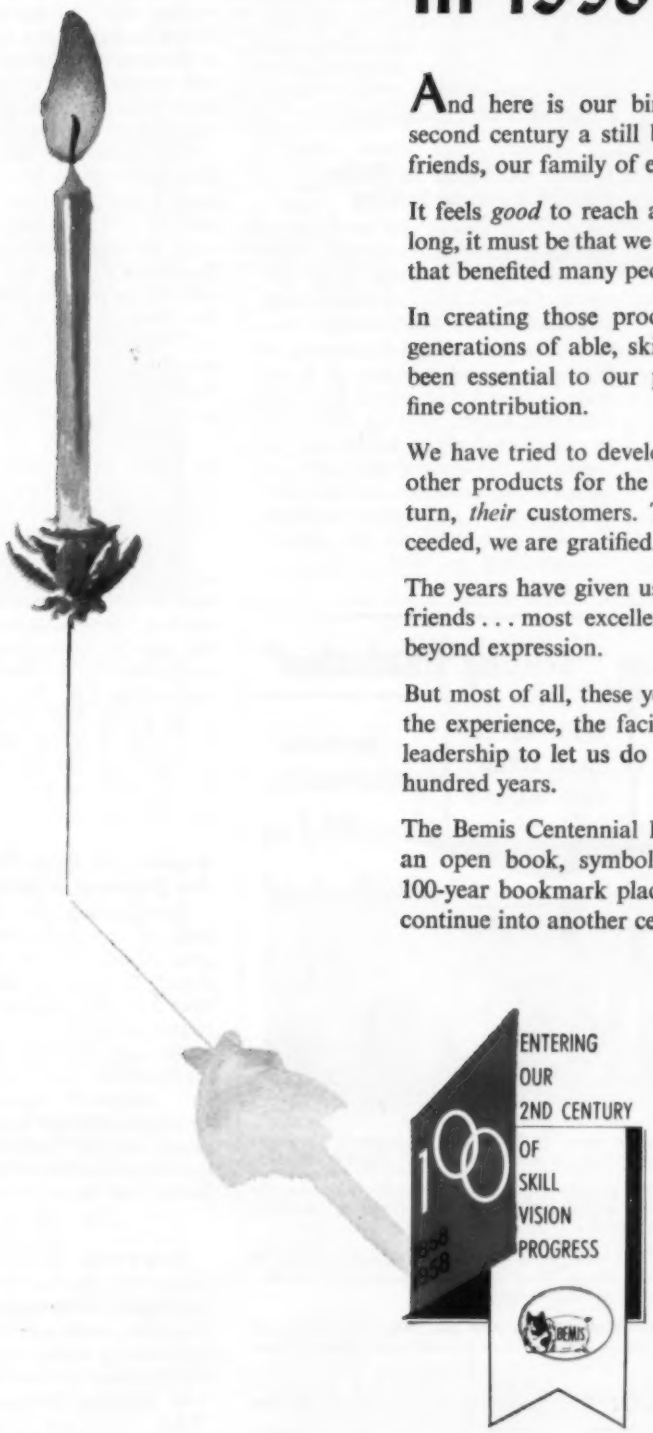
Working under the direction of the Peoria plant metallurgist are metallurgical, chemical, and welding staff engineers who evaluate new materials, establish testing techniques, prescribe specifications, help solve manufacturing problems and develop new applications.

Another group, the heat treat engineering staff, has the important job of initiating the planning and scheduling of all instructions for production heat treat operations. The Metallurgical and Materials Division's facilities contain a number of specialized laboratories.

National Carbide Company, New York, N. Y., a division of the Air Reduction Company, plans to erect a $2,000,000 plant in Louisville, Ky., for lime reclamation.

Production and sales of Uganda cement reached new record levels in October, 1957, when, for the first time, more than 10,000 tons of locally-produced cement was sold.

We are 100 years old in 1958



And here is our birthday resolution: To make our second century a still better one for our customers, our friends, our family of employees and our company.

It feels *good* to reach a hundred. To live and grow that long, it must be that we have created products and services that benefited many people.

In creating those products, we have had the help of generations of able, skilled Bemis employees. They have been essential to our progress and we appreciate their fine contribution.

We have tried to develop and make *better* packages and other products for the benefit of our customers, and in turn, *their* customers. To whatever extent we have succeeded, we are gratified.

The years have given us opportunity to make uncounted friends . . . most excellent friends . . . and these we prize beyond expression.

But most of all, these years have permitted us to develop the experience, the facilities, the talented personnel, the leadership to let us do an even better job in the second hundred years.

The Bemis Centennial Emblem represents this aim. It is an open book, symbolizing the story of Bemis . . . the 100-year bookmark placed to indicate that the story will continue into another century of service.

Bemis

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C. C. Winning

Charles C. Winning Appointed To Supervise Arkansas Plant

Charles C. Winning has been appointed superintendent of the $12,000,000 cement plant now under construction at Foreman, Ark., by the Arkansas Cement Corporation, a subsidiary of Arkansas Louisiana Gas Company.

Prior to plant operation, which is scheduled to begin in the fall of 1958, Mr. Winning is aiding in the supervision of plant construction, which began in November with groundbreaking by Governor Orval E. Faubus of Arkansas.

A veteran in mineral processing, Mr. Winning was assistant operations superintendent of the Olin Mathieson Chemical Corporation alumina plant at Burnside, La., for the last two years. He was associated with Aluminum Company of America for 16 years, spending 12 years at plants in Benton and Bauxite, Ark.

Lester C. Smull Is Victim Of Fatal Heart Seizure

Lester C. Smull, vice-president of Riverside Cement Company, died unexpectedly on January 17 in Riverside, Calif. The 57-year-old executive suffered a heart attack.

A graduate of the University of Washington, and a veteran of World War I, Mr. Smull joined Riverside Cement Company in 1922. He served successively as a salesman, assistant to the general manager, assistant to the president, assistant general manager, and works manager. He was appointed to the post of vice-president in 1950.

Automatic Control System Installed at San Andreas By Calaveras Cement Co.

A completely automatic system of kiln operation is "on stream" at the Calaveras Cement Company plant in San Andreas, Calif. Measures taken at this plant to perfect a sensitive complex of instruments for regulating the 360-ft. long revolving fifth kiln have been closely watched in the cement industry, since the control system is regarded as a major move toward automation in the manufacture of cement.

The system at San Andreas was designed jointly by Lewis A. Parsons, Calaveras consulting engineer, and Mel C. Sutton, chief chemist, with the technical assistance of Nels Swanson. For the first time, a method has been provided to measure the temperature of the mix in the calcining zone of the kiln, approximately 110 ft. from the start of the burning zone. Temperatures in this area average 1,400 deg. F.

Changes in the mix temperature, as noted by the instruments, bring about immediate compensating changes in fuel and air flows, to keep the burning process uniform.

Until now this phase of cement manufacture has required the attention of an operator skilled in estimating temperatures in the calcining area by comparing the recorded temperatures at feed and burning ends of the kiln. The operator would then make manual adjustment of fuel and air flows. The new system of precision control makes possible a uniformity of production not previously attainable.

Record '58 Sales Predicted For National Gypsum Co.

Disregarding the pessimistic outlook of many businessmen, Chairman Melvin H. Baker of the National Gypsum Company predicts that his firm will set a new sales record in 1958.

"Because of favorable prospects for construction and improvements in the company's operations, we are optimistic enough to expect that National Gypsum sales, next year, will increase by about $10,000,000," Mr. Baker said in a year-end interview.

ROBERT K. DUEY, formerly chief engineer of the Southern Lightweight Aggregate Corporation, Richmond, Va., has been appointed structural engineering representative in Washington, Maryland, and Pennsylvania, with headquarters at Gaithersburg, Md.

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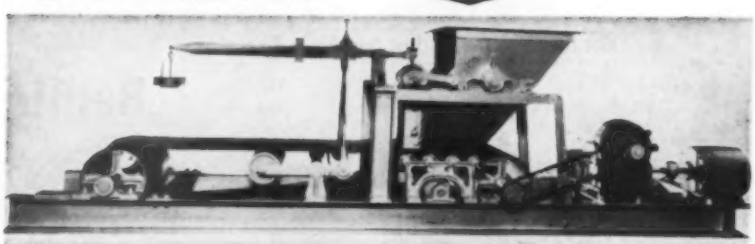

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Poidometers now available with total weight recorders, and remote control devices for indicating and changing feed rate.

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G. N. Scott, President Pioneer Sand & Gravel Given High Civic Honor

Gordon N. Scott, president of Pioneer Sand & Gravel Company, reportedly the Pacific Northwest's largest sand and gravel firm, was recently awarded Seattle's highest civic honor when named **"Seattle's** First Citizen for 1957."

This award is presented annually by the Seattle Real Estate Board to

Gordon N. Scott

an individual for outstanding community service.

Mr. Scott's civic achievements include the presidency of the Seattle Symphony Orchestra, and directorships of the Seattle Foundation, Seattle General Hospital, National Bank of Commerce, United Good Neighbors and Greater Seattle, Inc. He has also participated actively in church work and the following organizations: The Seattle Goodwill Industries, the Seattle Rotary Club, the Seattle Rainier Club, the National Council of Christians and Jews, and several other groups.

Mr. Scott has been president of Pioneer Sand & Gravel Company since 1935.

Ontario Custom Crushing Opens Plant Near Paris

The Ontario Custom Crushing Ltd., operating under contract in a pit owned by the Flintkote Company of Canada Ltd., recently opened a new crushing plant near Paris, Ont.

Designed by Ontario Equipment and Supply Ltd., the plant is capable of producing three types of washed aggregate and construction sand simultaneously at the rate of 200 t.p.h.

• The Portland Cement Association has put this two-unit electronic computer into operation at its Chicago headquarters. The "electronic brain" is being used to prepare programs for design of concrete pavements, structures, and material for design manuals. These will be made available to engineers and architects, enabling them to save time and manpower in design.

The device, composed of a Bendix G-15D General Purpose Digital Computer and a DA-1 Differential Analyzer, has prepared design data on dowels for pavement, barrel shell roofs, and box culverts. It will enable P.C.A. to speed development of comprehensive design charts and manuals.

The Chilean Development Corporation (Fomento) plans to construct a cement plant in the Province of Antofagasta to serve customers in the extreme north of Chile.

Arkansas Lightweight Aggregate, Inc., began operations this month at its new plant in England, Ark. Constructed at a cost of $300,000, the plant will process 300 cu. yd. of lightweight aggregate daily.

Myers Materials of El Dorado, Kans., has bought the A. C. Sand and Gravel Company, Arkansas City, Kans. The new owner plans to expand and modernize the plant.

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solves more recovery problems...costs less to install...

A major design improvement on the widely used and highly regarded DUSTEX Collector assures you efficiency *—superior to collectors costing much more.*

ALL NEW TUBE DESIGN—Longer, larger cast tube produces the following results...

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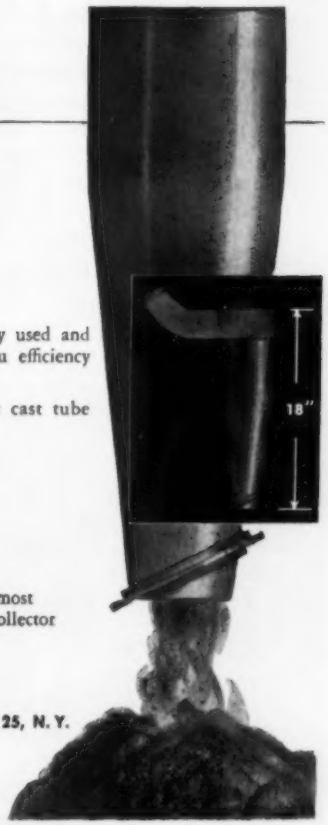

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42" x 48" JAW CRUSHER

with welded steel frame

GREATER CAPACITY! Who says so? Large aggregate producers who have owned and used other good makes of jaw crushers! That's *how* they *know* that this Telsmith 42 x 48 gives 'em more production, right along. It's Telsmith design—based on long years' experience—design that correctly locates pitman shaft and toggle in relation to crushing chamber; then combines this with the stroke and speed that's exactly right.

THE BEST FRAME EVER BUILT — a double-wall, box-section, continuous-welded, accurately machined, stress-relieved, two-piece, all-steel main frame.

ALL PROVEN FEATURES — Annealed cast steel pitman; large diameter eccentric shaft; cylindrical type heavy-duty roller bearings; reversible jaw dies; and hydraulic adjustment of discharge opening. For reliable, profitable production—you can't buy a better jaw crusher.

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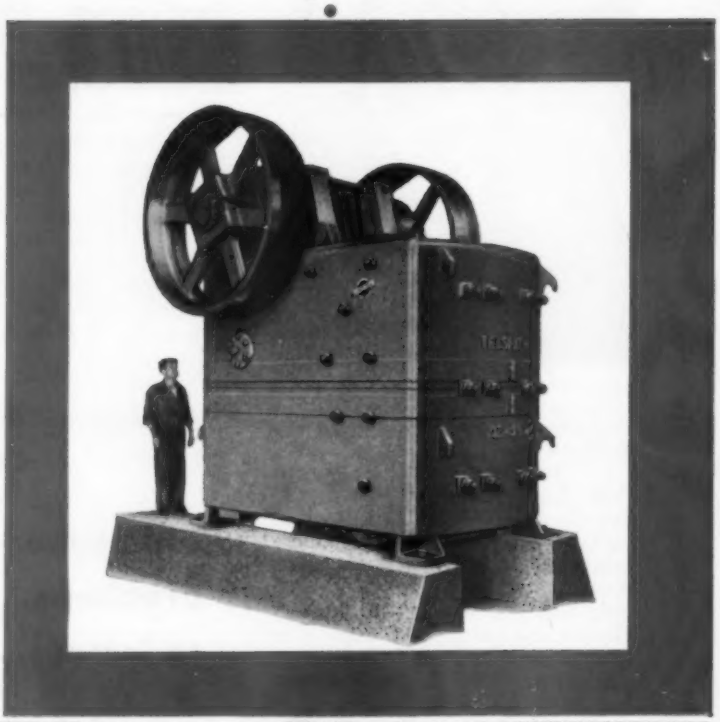

J-2

Producing aggregate for St. Lawrence Seaway with 42 x 48

Mounted 42 x 48 for road construction in Oregon

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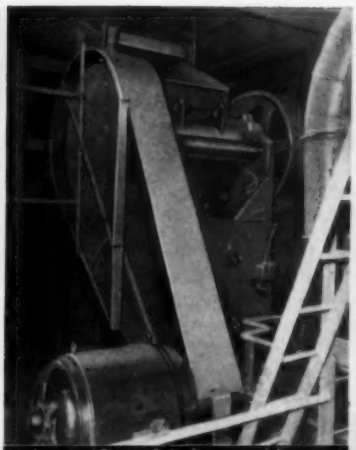
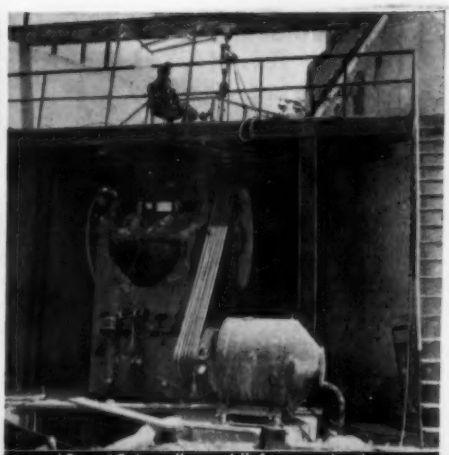
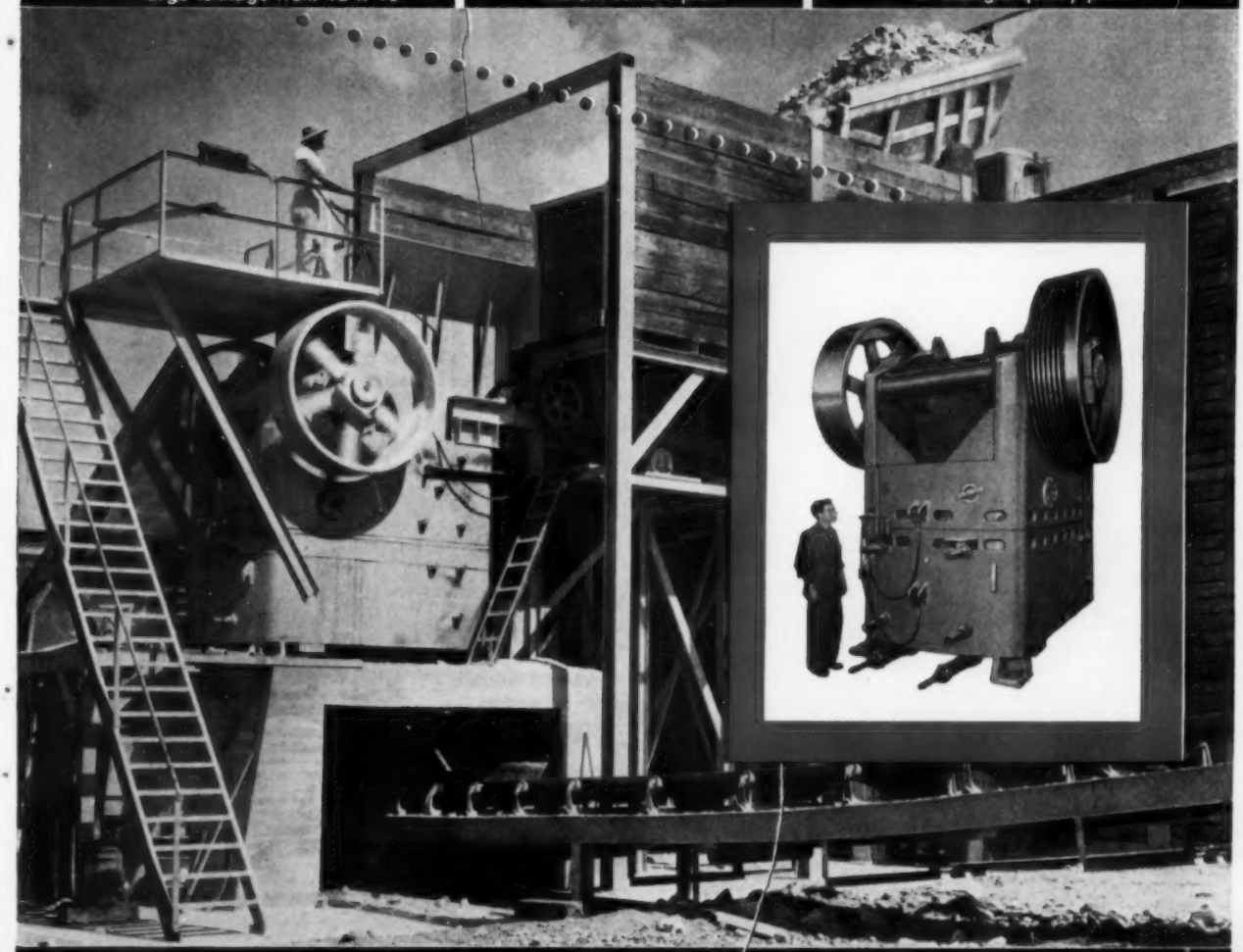
Alabama crushing plant gets large tonnage from 42 x 48



A 42 x 48 in large mid-western cement plant



42 x 48 is a "peach" for production in Georgia quarry plant



In this North Carolina quarry plant 42 x 48 Jaw again proves its big capacity

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Top Public Works Volume Offset by Private Totals; 1957 Showing Declines

Heavy construction contracts for public works boomed to a record high in 1957, but the rise was offset by a 38 percent drop in private awards. Combined total contract awards dropped to $17,986,000,000 in the third-biggest year in history. Volume was down 17 percent from the 1956 all-time high, and 3.9 percent under 1955.

This is the second time since 1949 that public works has outdistanced total private heavy construction contracts. In 1952, atomic energy plants, valued at near $2,000,000,000, served to push the public total ahead of private volume. This shift in emphasis from private to public is expected to continue in 1958 because of further increases in state and local contracts.

Sparking the 1957 rise in public contracts was federal heavy construction which zoomed 29 percent above 1956 to $2,200,000,000. In addition, state and local project awards gained 14 percent as they racked up a record $7,400,000,000.

By contrast, the 1955-56 boom in private heavy construction was nowhere to be seen in 1957. The 1957 total of $8,400,000,000 was the lowest for private work since 1954.

Industrial building contracts fell 42 percent below the 1956 peak, and other major types of private work also fell off: mass housing, 43 percent; commercial building, 14 percent, and "unclassified," 36 percent. (This category includes mainly pipelines, transmission lines, and private hydro power projects.)

The year 1957 marked record highs for the following types of work:

Bridge contracts soared 26 percent above 1956 to $781,000,000; highways climbed 20 percent to $3,000,000,000; earthwork-dams-waterways rose 33 percent to $969,000,000; waterworks contracts posted a 4 percent gain to $369,000,000.

Sewerage contracts came within 4 percent of matching the 1956 peak.

Public housing contracts last year soared 102 percent over 1956, with awards of $642,000,000, while public buildings, excluding housing, jumped 12 percent in 1957 to $2,400,000,000.

Regionally, New England is the only area to show an increase in contract awards in 1957. Contractors booked a record total of $1,191,000,000, up 7 percent from 1956.

In other regions, contractors found less new heavy construction available in 1957 than in 1956. Declines were modest in the Far West, 10 percent to $2,792,000,000; South 12 percent to $2,259,000,0000, and the Middle West, 15 percent to $3,933,000,000. The middle Atlantic region showed more of a drop, 22 percent to $4,340,000,000, while the region west of the Mississippi experienced the greatest decline, 27 percent to $3,471,000,000.

A.S.M.E. "Fellow Award" Goes to Myron A. Kendall

Myron A. Kendall, 75 year old dean of conveyor engineers and board chairman of Stephens-Adamson Manufacturing Company, was

M. A. Kendall

recently awarded the American Society of Mechanical Engineers' "Fellow Award."

During a 50-year career of achievement, Mr. Kendall has been credited for the development of several engineering firsts, among them the 4½-mile-long conveyor system on the banks of West Virginia's Monongahela River, the anti-friction bearing carrier, the full turn-over pivoted bucket carrier, the live-shaft three-pulley carrier, the self-unloading bulk-cargo vessel, and the Carveyor, Speedwalk, and Speedramp passenger conveyor systems.

Prior to assuming the chairmanship of the board of Stephens-Adamson, Mr. Kendall served as draftsman, chief draftsman, and chief engineer of the company.

In Nigeria, Associated Portland Cement Manufacturers Ltd., the Western Region Production Development Board, and United Africa Company of Nigeria Ltd. have signed an agreement to construct a cement plant costing between £2,500,000 and £4,500,000.

Statistics Show Perlite Maintains Output in 1957 Despite Building Slowdown

Perlite reportedly has become the nation's most popular plaster aggregate. According to the 1957 annual report issued by the Perlite Institute, the industry's international trade association, latest statistics show that 53 percent of all plaster applied last year in the United States used perlite as the aggregate. This compares with 44 percent in 1955.

Total industry sales for 1957 are estimated to have held firm with a dollar volume of $15,700,000 for crude and expanded perlite, despite a decline in the building materials industry. Output of the white, ultra-lightweight aggregate, produced by 84 plants in 30 states, also maintained a level of 260,000 short tons.

For 1958, Richard J. O'Heir, secretary-treasurer of the Institute, predicts that perlite sales will remain on the 1957 level since only slight increases in public and private construction are expected and 85 percent of perlite sales are made to the building industry. However, there are several strong trends indicating highly favorable long-term growth prospects for the perlite industry.

Study Shows "Free" Liming Benefits Soil of Farmers

A recent report on the extent of wind-blown limestone dust in western New Jersey has disclosed that "free" liming is considerable near cement plants.

Fred B. Clucas and J. C F. Tedrow made a study of the pH of 79 samples of Annandale soil collected within a 10-mile radius of a cluster of five limestone cement plants located near Easton, Pa.

The results showed that the pH was as high as 8.1, and nearly half of the samples tested were 7.0 or higher in soil which normally had a pH of 4.5 under virgin wooded conditions. The effects of the dust diminished as distance from the plants increased, but free liming was evident as far out as 10 miles. It was also reported that the limestone had penetrated at least 4 ft. into the soil.

The Aalborg Portland Cement Works of Denmark is constructing a cement plant near Karlstrup, 20 miles south of Copenhagen. Scheduled for completion some time this year, the plant will have an annual output of 130,000 metric tons or about 3,000,000 sacks of cement, a 10 percent increase in Danish cement production.

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You will get higher production from a P&H 255A with these features:

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See your P&H dealer soon for the *profitable* 255A story—a story that gets even more profitable when you order your 255A equipped with a P&H Diesel Engine. It's the highly responsive engine with greater torque that outperforms other diesels.

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U.S.A. '57 Mineral Output Reaches Record Value—Nonmetals Top $16 Billion

Mineral output in the United States attained a record value of $18,300,000,000 in 1957, a gain of more than $750,000,000 over 1956, according to the annual Bureau of Mines preliminary production report for the year. The 1956 value was $17,500,000,000. The Bureau's report, showing production data by commodity groups, follows:

Mineral Production in Continental United States, 1956 and 1957 (Million Dollars)

Nonmetallic minerals		
Fuels[1]	$11,711	$12,732
Other	3,415	3,470
Total nonmetallics.	15,126	16,202
Metals	2,357	2,084
Grand total ..	17,483	[2] 18,286

The 1957 increase was due almost entirely to higher values for the mineral fuels, particularly crude oil and natural gas, which were large enough to offset declines in production for most other minerals as well as sharp drops in base-metal prices. Natural gas and iron ore were the only major commodities to show sizable production increases.

Anthracite, cement, gypsum, phosphate rock, bauxite, chromite, and tungsten all declined in both production and value.

In contrast, helium, barite, diatomite, cobalt, mercury, ilmenite, and uranium ore all registered substantial production and value gains.

Output of 5,900,000 tons of magnesite and dolomite for basic refractories in 1957 reflected a rise of 11 percent in demands of the iron and steel industries.

Cement production in 1957 was down about 7 percent from 1956, due largely to strikes in the building trades on the West Coast and in the cement mills east of the Mississippi. The industry continued to look forward to expanding demand from highway and other construction, and several new plants were brought into production.

Due to the decline of residential construction, the production of gypsum and gypsum products was lower in 1957 than in 1956. A decrease of about 14 percent was reported in the quantity of domestic crude gypsum mined during the year, and imports also dropped. Several new gypsum products plants began operating.

Output of stone and sand and gravel in 1957 is estimated to have increased about 6 percent over 1956. Preconstruction phases, such as land acquisition for the huge interstate highway program begun in 1956, were in progress, and use of aggregates in actual construction was growing. Other factors tending to limit the increase in 1957 were the slow-down in residential construction and the mid-year cement strike.

Total clay production fell off about 5 percent, compared with 1956. An overall lag in construction using heavy clay products and a slight lessening in demand for refractories in the steel trade were the principal causes of the decline.

An increased demand for kyanite concentrate in mullite refractories and for crude kyanite ore in special refractories contributed to a rise of about 5 percent in the domestic production of kyanite, compared with 1956.

Stepped-up demand for feldspar by the glass-container industry was partly offset by decreased demand in pottery, but the total production was higher than in 1956.

Output of sheet mica was expected to have dropped appreciably as substitutes continued to reduce the demand for the lower qualities of mica used in electrical appliances. Scrap mica production continued at nearly the 1956 level to meet demands for ground mica, principally in the building industries.

Phosphate rock production was less than in 1956 when producers were rebuilding depleted stocks. Total sales of phosphate rock remained about the same as in the previous year. Potash production continued its upward trend.

Domestic talc production decreased slightly, due to lower demand for ceramic floor and wall tile.

Production and shipment of fluorspar in 1957 remained about equal to those of 1956. However, imports established a new high, and consumption gained. Shipments of acid grade increased, whereas metallurgical grade declined somewhat. The government purchase programs for acid and metallurgical grades continued throughout the year.

An indication of major changes taking place in the sulfur industry was the price cut announced in September. Output in the United States was lower than in the previous year, and stocks increased. Imports rose as substantial tonnages from new mines in Mexico moved into the American market.

There was a notable growth in capacity for the production and consumption of boron minerals and compounds. Of major interest to the industry were developments in the use of boron in jet-plane and rocket fuels.

Barite production and imports mounted to meet growing demand. Oil and gas well drilling was again the principal market for barite. Its use as concrete aggregate for high-density concrete increased.

Production of asbestos was maintained in 1957 at about the same rate as in 1956. A government program for purchasing asbestos from domestic mines was in effect through 1957.

[1] Fuels include natural gas, petroleum, natural gas liquids, asphalt and related bitumens, carbon dioxide, anthracite, bituminous and lignite coal, peat, and helium.

[2] Subject to revision.

Rossi Named Chairman Of Detroit Concrete Board

The Concrete Improvement Board of Detroit, Michigan, has announced the election of officers and directors for 1958.

Dominic Rossi, Darin & Armstrong, Inc., was named chairman; Donald Ziegler, Cooper Supply Company, is secretary; and Thomas Burke, C. J. Burke Company, is treasurer.

Permanente 11-Month Sales Reach $50,000,000-Mark

Sales of the Permanente Cement Company, Oakland, Calif., have been estimated to total more than $50,000,000 for the 11-month fiscal period ended December 31, 1957, according to Wallace A. Marsh, vice-president and general manager.

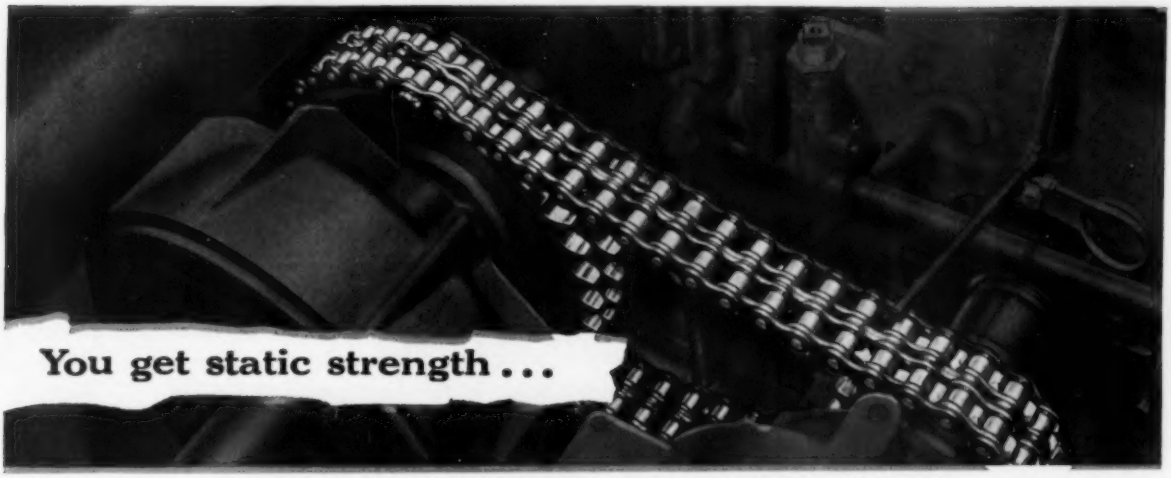
For the 1956 fiscal year ended January 31, 1957, Permanente reported sales of $43,533,000. The company changed its fiscal year ending January 31 to a calendar year basis last October.

The estimate includes savings realized from broader depletion allowances upheld by the Supreme Court last fall, but does not carry the adjustment back to prior years. The broader allowance added $970,000 to Permanente earnings for the first nine months.

CURTIS F. PLANK has been appointed plant manager of the North American Cement Corporation's plant at Howes Cave, N. Y., to succeed H. Hilton Long, who has been transferred to the engineering department of the New York office.

WRIGHT ESHELMAN has been promoted to assistant controller of Kaiser Gypsum Company, Oakland, Calif. Mr. Eshelman joined the firm in January, 1947, as cost accountant.

Why tough-service drive and conveyor jobs demand LINK-BELT roller chain



RESISTANCE TO TENSILE STRESS is achieved with properly heat-treated, accurately machined side bars made of premium steel and fitted with properly hardened pins, bushings, rollers.

STRENGTH OF CHAIN IN MOTION results from such refinements as pitch-hole preparation, micro-finish of parts, special processing of side bars, pre-lubrication, rigid quality control.

THE *greater dynamic strength* found in Link-Belt precision steel roller chain is essential for long life on today's harder-working drives and conveyors. This added capacity to resist shock loads, centrifugal loads and similar stresses is achieved only because Link-Belt adds refinements in manufacture.

These include lock-type bushings, shot-peened rollers, pre-stressing, closer heat-treat control. The result: a precision chain that takes stresses in stride . . . provides smoother, more efficient performance that measurably outlasts ordinary roller chain — reduces costs.

For full data on Link-Belt roller chain, see your Link-Belt office or authorized stock-carrying distributor.

LINK-BELT

ROLLER CHAIN & SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.472

Enter 45 on card, page 101

For The Ultimate in DUST and FUME COLLECTION Be Sure It's...

WESTERN PRECIPITATION *First* in Electrical Precipitators

Plant operators who want the finest equipment available for dust and fume collection will find nothing equal to the long life, high efficiency and low maintenance of *Western Precipitation* Electrical Precipitators.

The reason is simple— No other electrical Precipitator is backed by so many years of leadership in the field—nor incorporates so many outstanding advantages pioneered by the industry's most experienced organization in the development of Cottrell equipment—experience beginning with the world's first commercial Cottrell installation!

This cross-section of a typical Western Precipitation Electrical Precipitator shows a few of the many important details that go into the construction of these units...

CONSTRUCTION FEATURES

▶ Arrangement of curtains (1), baffles and hi-voltage wires (2) assures optimum uniformity of electrical field—therefore maximum collection efficiency.

▶ Baffles (3) insure minimum dust reentrainment and optimum gas distribution.

▶ Curtains and hi-voltage system are engineered for maximum stability, even distribution of rapper impact, and unequalled ease of installation.

▶ No moving parts in the gas stream.

▶ Supports (4) for hi-voltage system are specially designed to resist side thrusts, and require minimum maintenance.

▶ Internal stiffeners permit clean, smooth external surfaces for easy insulation (5).

▶ Air-swept insulator compartments (6) insure long life, minimum maintenance.

▶ Unobstructed free-flowing hoppers (7) permit complete dust evacuation.

ADVANCED RAPPER DESIGN

▶ Frequency and intensity of rapping is variable over wide ranges to eliminate puffing and meet individual operating requirements.

▶ All rappers (8) are external for easy adjustment and maintenance.

▶ Flexible mounting—either side or top.

SAFETY ENGINEERED

▶ Hi-voltage insulators (9) are protected by separate compartments with individual access (10).

▶ Quick-opening access (11) doors are positive-sealing.

▶ Complete interlock system available at minimum cost.

"TRANSISTOMATIC" PRECIPITATOR CONTROL

▶ No tubes, no relays, no moving parts— *carries lifetime guarantee!*

▶ *Infinitely* variable precipitator voltage to suit operating conditions.

▶ Automatically compensates for line voltage fluctuations.

Before finalizing plans for installing any dust or fume collection equipment, get the full story on the finest collection equipment available—Western Precipitation Cottrells!

Enter 46 on card, page 101

WESTERN PRECIPITATION CORPORATION

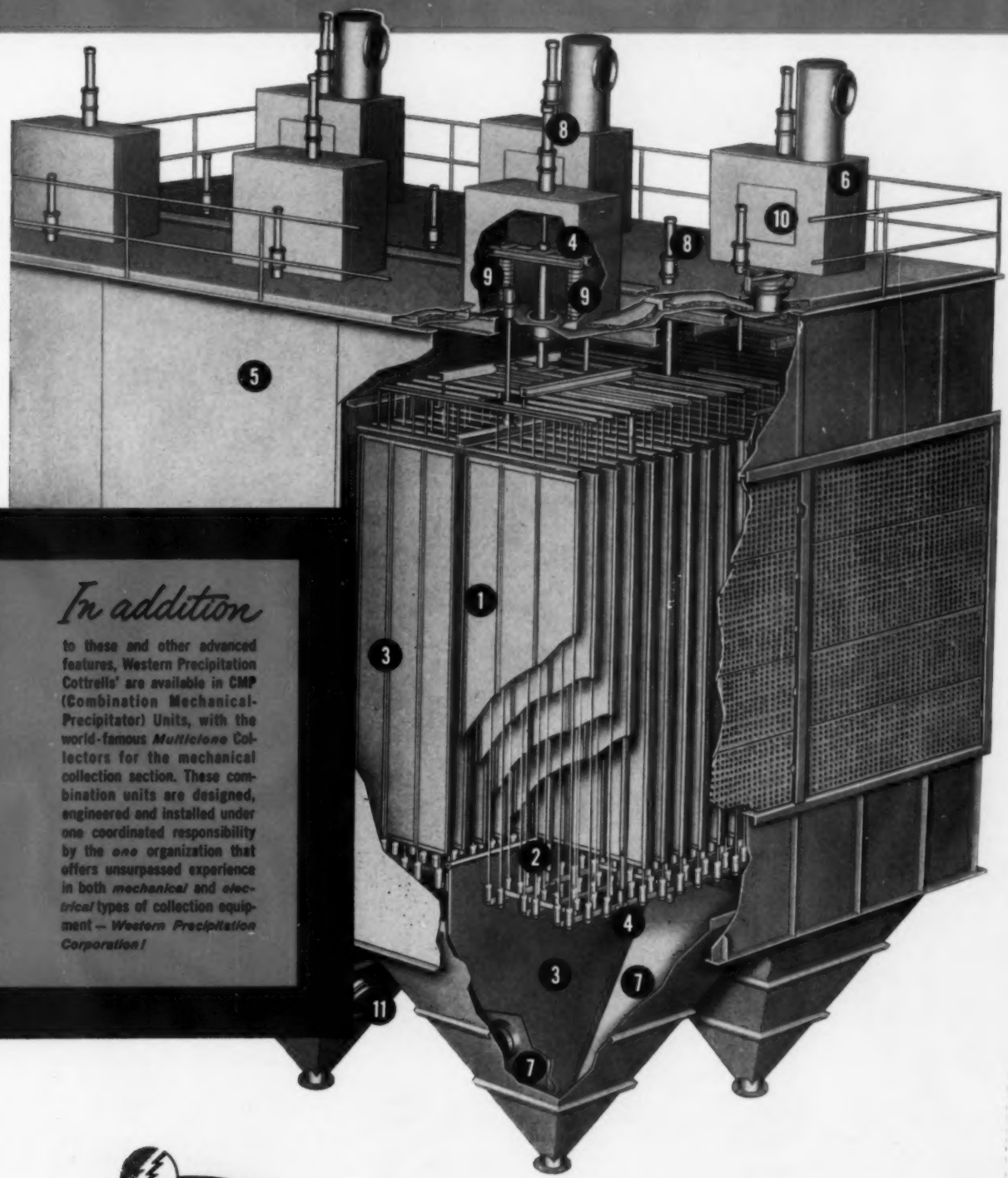
Engineers and Constructors of Equipment for Collection of Suspended Material from Gases . . . and Equipment for the Process Industries

LOS ANGELES 54 • NEW YORK 17 • CHICAGO 2 • PITTSBURGH 22 • ATLANTA 5 • SAN FRANCISCO 4

Representatives in all principal cities

Precipitation Company of Canada Ltd., Dominion Square Bldg., Montreal

The only equipment backed by a *Half-Century of Cottrell Experience*



In addition

to these and other advanced features, Western Precipitation Cottrells' are available in CMP (Combination Mechanical-Precipitator) Units, with the world-famous *Multiclone* Collectors for the mechanical collection section. These combination units are designed, engineered and installed under one coordinated responsibility by the *one* organization that offers unsurpassed experience in both *mechanical* and *electrical* types of collection equipment — *Western Precipitation Corporation!*

WP

REMEMBER—*in the field of dust collection, nothing equals the long life, low maintenance and high collection efficiency of a Cottrell Electrical Precipitator!*

New Machinery
and Equipment

For Further Information Use Card on Pages 101-102

● Model 404, the largest and most powerful unit in Yale & Towne's Trojan line of four-wheel-drive tractor shovels, is rated at 4 cu. yd. capacity. Designed to handle all types of bulk materials, the loader weighs 40,500 lb., and has an operating capacity of 14,000 lb. Travel speed ranges from 3.5 m.p.h. in low to 20 m.p.h. in third, in both forward and reverse.

The 4 cu. yd. general utility bucket is 120 in. wide and spans the wheels to protect the tires. Two other buckets are available as standard equipment: a narrow bucket, 96 in. wide, also rated at 4 cu. yd.; and a 120-in. wide bulk materials bucket, rated at 5 cu. yd.

The Model 404 has a dumping clearance of 13 ft. 7 in. under the hinge pin and 10 ft. 6 in under the bucket cutting edge. At this point there is a dump angle of 50 deg. so as to allow for full and quick cleanout of the bucket.

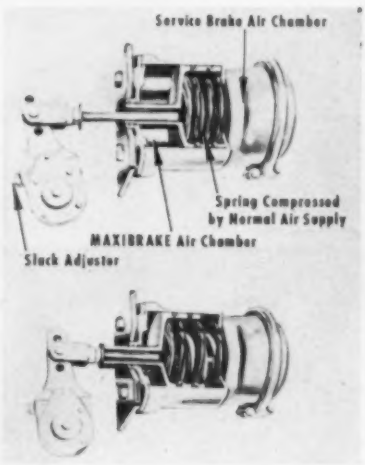
The Model 404 is powered by a 6-cylinder, 425.6-cu. in. displacement diesel engine, developing 240 hp. at 2,250 r.p.m. It is equipped with an Allison planetary full automatic torqmatic transmission, and Timken Detroit planetary axles.

Another feature of the Model 404 is the straight line horizontal thrust of the operating arms, which starts the push of the operating arms from the rear of the machine and continues it through the body of the machine to the cutting edge of the bucket. Thus the full power of the machine is utilized each time the bucket cuts into a work pile. **(301)**

● Link-Belt's Jetslinger is suitable for handling many bulk materials, including sand, for stockpiling and loading operations.

Capacities of up to 700 t.p.h. can be handled, based on material weighing 50 lb. per cu. ft. Capacities vary in relation to the density of material handled. The size of lumps which can be handled is dependent on the type of material and screen analysis.

Under certain conditions, the Jetslinger can throw material a distance of 90 ft. or pile it to a height of 35 ft. above the Jetslinger. **(302)**

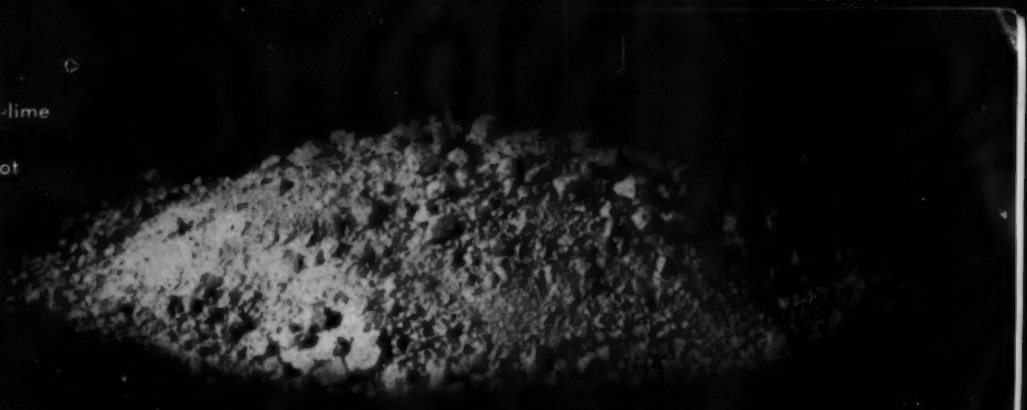


● A new air released, spring applied brake attachment for air brake systems has been introduced by The Maxi Corporation. Called Maxibrake, the attachment is added to the existing service brake system, and provides an automatic application of the service brakes when the air supply is depleted through extreme use or other causes. If air pressure drops below 60 p.s.i., the brake attachment automatically begins to brake the vehicle.

Driver control of the brake attachments can be provided by locating a hand valve in the cab. With the hand valve, the driver can use the Maxibrake attachments regularly to assure safe, positive parking.

The brake attachment is installed between the service brake chamber and its mounting bracket, and does not affect the operation of the service brakes providing the reservoir air pressure is above 60 p.s.i. **(303)**

Coarse grades of ag-lime take longer to reach the plant's feeder root zone and are less desirable.



Ag-lime **FINES** bring more money

Fine grades of ag-lime bring almost twice the market price and are in great demand

(Eagle's portable cage mill at work on property of John W. Karch Stone Company, Celina, Ohio.) The purchase and installation of this plant resulted from a Karch sample being processed into an improved product through an Eagle Cage Mill. Completely satisfied with the results, this machine is now producing approximately 25 tons per hour—easily meeting all state specifications.

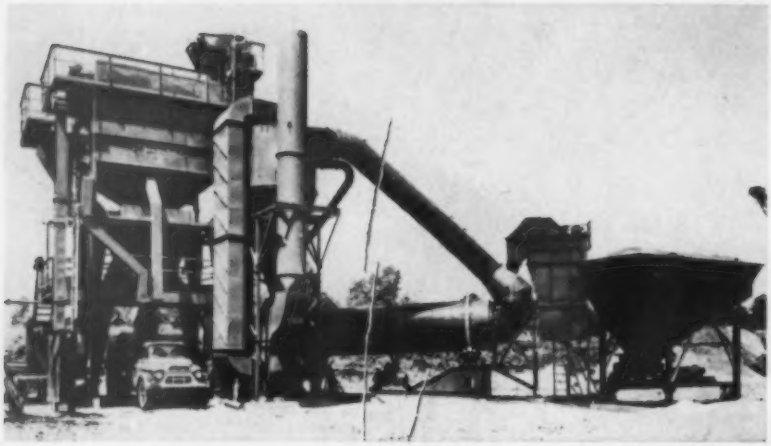
You can pick up the steady big premiums on finer ag-lime. Today's scientific farming demands this grade of ag-lime, which, because it is absorbed faster, can recover the investment faster with cash crops.

EAGLE CAGE MILLS produce more fines!

A single pass Eagle four-row cage mill with its high-speed impact, disintegrating action using hard-faced bars, not only produces a finer aggregate—it increases the tonnage as well! The single pass design has been producing this superior quality ag-lime at an average rate of 30 tons per hour, subject to variations in raw material and weather conditions.

EAGLE
JAW CRUSHERS · IMPACT BREAKERS
PULVERIZERS · CONVEYORS · LOADERS
CRUSHER CO., Inc.
GALION
OHIO·U·S·A

Special offer ... Send us a sample (200# to 500#) of your present ag-stone, *freight collect*, for Eagle's gradation improvement test. We will put it through an Eagle Cage Mill, make a product report, and ship the resulting ag-lime back to you for your inspection. You're welcome to be on hand when the batch is processed, if you can make it. No obligations of any kind. We are convinced an Eagle mill can make more money for you and want to prove it to your satisfaction!



● The Bollard Asphalt Plant Division of the Colonial Iron Works offers new design features in its semi-portable and stationary asphalt plants, manufactured in capacities ranging from 60 to 180 t.p.h.

Mixers of 2-, 2½-, or 3-ton capacities now can be installed in the same tower. Mixers of 1½-ton capacity are installed in a smaller tower unit.

Another feature makes possible the easy placement of liners, which are bolted. A heavy-duty chain and sprocket drive rotates the dryer, minimizes torque on the dryer shell, and by eliminating the conventional ring gear, reduces the weight of the dryer.

Illustrated is an installation of a 120-t.p.h. semi-automatic plant with a 2-ton capacity mixer. **(304)**

● Alloy Rods Company recently introduced its Wear-O-Matic wire feed unit for semi-automatic open arc hardsurfacing. The company has also developed a new line of Wear-O-Matic open arc 7/64-in. diameter hardsurfacing wires, packaged in Payoffpaks, for use with the welder.

Weighing only 70 lb., the Wear-O-Matic unit can be moved easily from

job to job by one man. It will operate from nearly any d.c. power source. Only two electrical connections are required. Another feature is a set of straightening rolls just ahead of the double knurled feed rolls. Because the wire is straightened before entering the feed cable, it feeds more easily and will not oscillate as it comes out of the welding tip. **(305)**

● A new line of flexible high pressure wire-braided air hose for working pressures up to 1,500 p.s.i. is available from the Acme Rubber Manufacturing Company, a Division of the Acme-Hamilton Manufacturing Corporation. Known as Acme Gold Seal air hose, it is suitable for use on compressors, wagon drills, and jumbos in quarrying, mining, and other heavy-duty applications in which external abrasion on the hose is encountered and maximum flexibility and lightness of weight are required.

Acme Gold Seal hose consists of a thick, oil-resistant Neoprene tube, a one or two strand wire braid, and an abrasion resistant hard rubber covering. It is available in i.d. sizes from ½ to 2½ in. **(306)**

● The OM 321 Mercedes-Benz diesel engine is now available in the United States through the Utica Division of the Curtiss-Wright Corporation. This engine is manufactured in the 60 to 96 hp. range from 1,500 to 2,600 r.p.m.

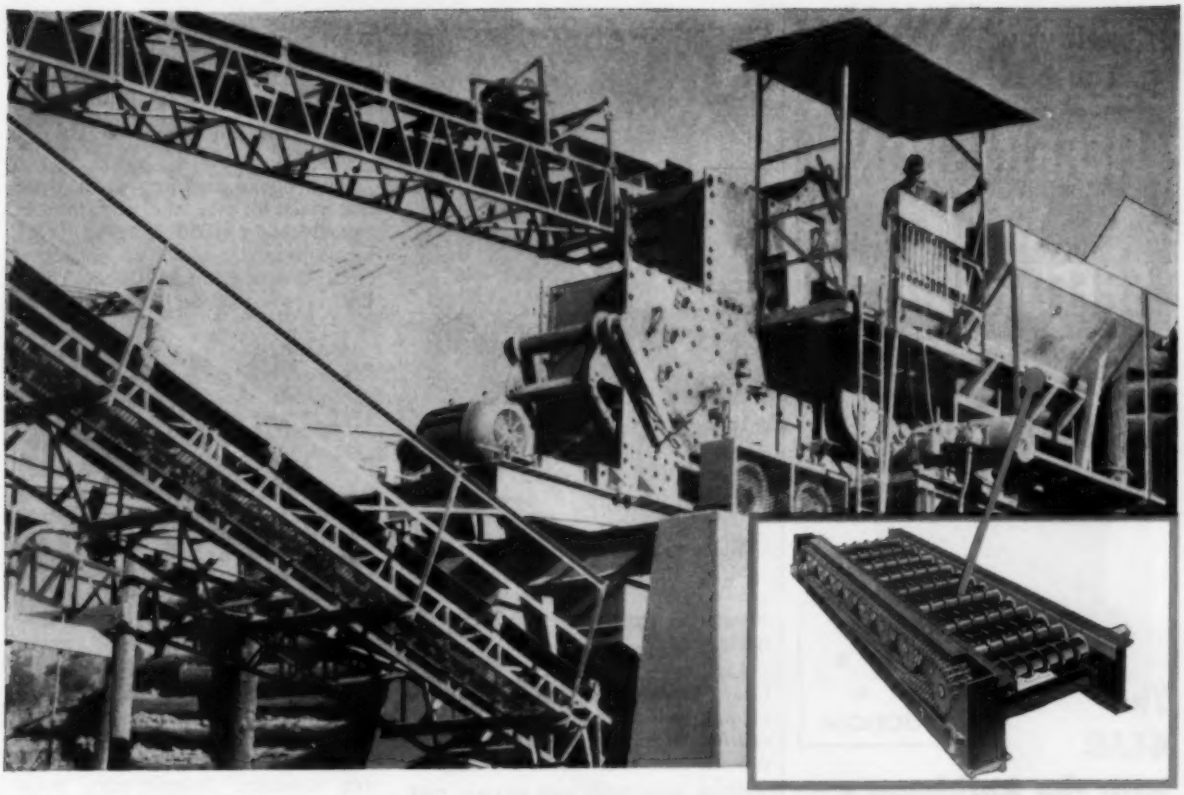
It is a six-cylinder, vertical in line, four-cycle, liquid-cooled engine with a compression ratio of 19.5 to 1. The Daimler-Benz pre-combustion

chamber type system provides smooth, even, quiet, smoke-free operation over a wide range of speeds and loads. Quick starting in low temperature weather is possible through the use of glow plugs.

The OM 321 is available in either heat exchanger or radiator cooled design. **(307)**

● Henry's L600 loader has a rated capacity of 1,500 lb. to full height, and a breakaway capacity of 3,000 lb.

Operating with 2½-in. bore double-acting lift and bucket cylinders with 1½-in. chromed rods and lower pressure of 1,250 p.s.i., the L600 offers up to 20 deg. of bucket rollback, a 58-deg. bucket dump, and a dump height of 9 ft. at 40 deg. dump. The loader can dig 4 in. below depth with a reach up to 3 ft. ahead of the unit at 40-deg. dump. **(308)**



"A Universal plant made aggregate production a profitable addition to our business."

says Ray Mast, Superintendent, Mullet Coal Company, Mount Eaton, Ohio

"For the past twelve years our company has been producing industrial coal at the Mount Eaton site. To mine the coal, we have to blast through a four-foot layer of limestone. Because of a growing demand for aggregate in this area of Ohio, we decided to expand our operation and make use of the limestone.

"In our quarrying operation, overburden is first stripped off, exposing the limestone floor above the coal. A tractor and broom sweep the surface clean for drilling and blasting. Between the limestone and coal is an intermediate layer of clay, dirt and mud. When blasted, this material mixes with the limestone to form a compound containing as much as 30% of objectionable fines. Our problem was to get rid of the fines before crushing the material to specification road stone.

"A highly satisfactory solution was found by using a Universal Wobbler Feeder ahead of our Universal Impact Master.

"Our Wobbler Feeder, a 9" pitch unit, has 16 bars composing a 36" wide bed at the bottom of the hopper. The bars, elliptical in shape and set at alternate vertical and horizontal positions, are spaced 2" apart. Ten-ton quarry loads are dumped on the feeder bed. As the bars rotate, the load is moved forward. The 2" and under material is scalped off ahead of the crusher and drops through the bar spacings. These unwanted fines are discharged to a waste pile by a reject conveyor. The oversize is fed to the Impact Master for reduction to specified size. The crusher functions as a primary and secondary by closed-circuiting with a screening tower."

This feeder-crusher combination was featured by Universal at its exhibit in Chicago during the January, 1957 Road Show. Since that time a number of these plants have been put into operation throughout the country. Mullet Coal Company is just one of these applications.

We'll be glad to tell you where they are and how they work and just what the Wobbler Feeder-Impact Master combination can do for you. Tell us the kind of material to be handled, the percentage of fines in the feed, size of fines to be removed and desired capacity in tons per hour. We'll furnish complete information at no obligation.

PETTIBONE UNIVERSAL
In Cedar Rapids Since 1906

UNIVERSAL ENGINEERING CORPORATION

619 C Avenue, N.W., Cedar Rapids, Iowa

Subsidiary of Pettibone Mulliken Corporation, 4700 W. Division Street, Chicago 51, Illinois

Continuous Tooth

HERRINGBONE GEAR SPEED REDUCER

SINGLE •
DOUBLE •
TRIPLE •
REDUCTION

The GEAR with the Backbone •

Some Proven On-the-Job Advantages of This Type of Gear Reduction Are:

1. No side thrusts, avoidable deflections, distortions, impact stresses.
2. Stronger teeth, due to archlike construction.
3. Greater load carrying capacity.
4. More silent and smoother gear action.
5. Uniform load across face due to balanced thrusts of opposing helices.
6. Better lubrication, due to wedge action of teeth.
7. Overall design makes it less costly to produce.
8. Can be substituted for straight tooth gears.

We have extensive facilities for making Herringbone Gears, producing them from 1" to 60" in diameter, 16 DP to 1½ DP and up to a 20" face.

YOUR GEAR INQUIRIES WILL RECEIVE PROMPT ATTENTION FROM US.

SEND FOR CATALOG 40-C

ESTABLISHED 1888

D. O. James

D. O. JAMES GEAR MANUFACTURING CO.
1140 W. Monroe Street, Chicago 7, Ill.

Enter 52 on card, page 101

● Pressure Products Company has added two new specialized chain lubricants to its line of industrial lubricants packed in aerosol-type containers.

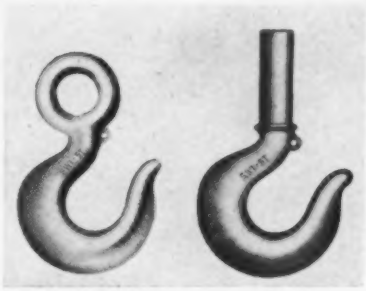
Nu-Aero heavy-duty chain lubricant is recommended for use on heavy industrial and construction equipment with moderate and slow speed chains.

Lighter in viscosity, Nu-Aero Chain Life roller chain lubricant is recommended for use on smaller size chains and high-speed chains. It will provide lubrication up to 600 deg. F.

These new lubricants contain rust preventatives, anti-wear additives, and are especially compounded to give extended lubrication in dusty and dirty locations. Nu-Aero heavy-duty chain lubricant contains ultra-fine graphite in a newly developed suspension. Nu-Aero Chain Life lubricant contains molybdenum disulphide to give increased wear qualities. **(309)**

● A new line of load rated Crosby-Laughlin hooks in sizes from ¾-ton through 50-ton capacities is now available from the Crosby-Laughlin Div., American Hoist & Derrick Company.

The hooks are forged in three materials to give the variation in capacities: C-1030 forging steel, heat treated, provides capacities from ¾-ton through 100-ton. This line is also available forged from



AISI 4130 Chrome Moly forging steel, heat treated, for higher capacities without increasing hook size. Alloy heat treated steel hooks are available from 1-ton through 150-ton capacity. Bronze alloy hooks through 8-ton capacity are also offered.

Each hook in the new line has a drilled cam as an integral part. At any time during its life, the hook can be made into a safety hook with the addition of a standard safety kit, which consists of a latch, spring, and pin. This cam does not interfere with normal hook use. **(310)**

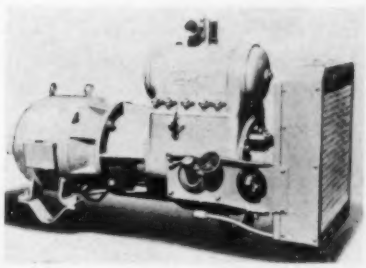
● Dart Truck Company now has available a 15-ton capacity end dump truck for heavy-duty hauling in quarries and mines.

With an 11-cu. yd. rock body as standard equipment, the new dump truck is offered with a choice of a 175- or 220-hp. diesel power plant and a single- or three-stage torque converter. **(311)**

● The Winkie diamond drill, recently developed by the Wink Corporation, has capacities ranging up to 6 in. in diameter and depth capacities to 200 ft. Penetration speeds in excess of 1 f.p.m. have been obtained at depths of 100 ft. in

medium to hard limestone, according to the manufacturer.

Engineering features include a water cooled gear box, safety clutch, built-in water swivel, and a convenient bullseye level. An aluminum alloy construction is used in the drill and engine. A 5¼ hp., two-cycle gasoline engine with a vacuum carburation system allows continued all angle drilling. A mechanical advantage lever may be used for applying pressure in drilling hard rock and deeper holes. **(312)**



● Davey Compressor Company introduces a new group of industrial stationary compressors for 1958. These Davey Hydrovane rotary units are available in 20 to 125 hp. sizes, operating at 125 p.s.i.

Features include quiet operation and freedom from vibration. The completely enclosed units are lightweight, compact, and do not require special compressor rooms or foundations. Easy to install and operate, the units are offered with both air-cooled and water-cooled oil coolers.

Illustrated is the 40 hp. model, which is 68 in. long, 30 in. wide, and 39 in. high. **(313)**

"Our BANTAM averages 120 yds. per hr. loading sand and gravel from stockpile"

"Beats a bigger rig we own!"

Here's another case where the low-cost BANTAM outproduces a larger machine. Palmer Sand and Gravel Co. of Jackson, Mich., uses this BANTAM T-35 to load from scattered points around the pit. Equipped with ½-yd. rehandling bucket, the BANTAM loads a 5-yd. dump truck in 1½ to 2 minutes. With two 10-yd. trucks it loads out 450-500 yds. in less than 4 hours, averaging 120 yds. per hour! Commenting on performance, owner Ed Palmer says the BANTAM outstrips his bigger rig.

Regarding maintenance on BANTAMS, Ed Palmer says, "It just doesn't cost anything to run 'em." He now owns 3 BANTAMS—has been a user for 9 years. In all that time his only replacement cost has been one set of swing clutches and 3 sets of trunnion rollers. That's for all 3 machines!

If you're looking for big production at lower costs, look into the money-saving facts about BANTAMS right now. Use the handy coupon.

WORLD'S LARGEST PRODUCER OF
TRUCK CRANES AND EXCAVATORS

SCHIELD Bantam Co.

219 Park Street, Waverly, Iowa, U.S.A.

Please send details on BANTAMS for sand and gravel work with type of mounting checked below: RP-116

☐ Carrier ☐ Crawler ☐ Self-Propelled

Name.....

Company.....

Address.....

City.....State.....

Enter 53 on card, page 101

See how they work that

At this giant strip mine, the Tiger Brand Amerclad (shown in foreground below) is tortured by being dragged over razor-sharp rock and constantly pelted by flying fragments that are being blasted. It lies in the sun, rain and snow during the 24-hour workday.

Enter 54 on card, page 101

Tiger Brand Amerclad

In wet or dry locations!

VERY FRANKLY, we do not make a range of Tiger Brand Amerclad qualities. When you see the Tiger Brand Amerclad mold identification on a length of portable cord or cable, you can be quite sure that nothing better can be purchased, no matter how much you want to spend for it.

The reason is that American Steel & Wire has catered strictly to the *heavy-duty* market where portable cord or cable is concerned. We're well aware that cable failure can be one of the most exasperating production difficulties that you can encounter. Expensive too, because nothing operates without power.

So the greatest care is lavished on Amerclad. Every inch of cable is vulcanized in a freshly cast lead sheath to insure a dense, tough, homogeneous sheath. Mechanical skimmers remove dross from the lead-melting pots, and the pots themselves are kept in an inert gas atmosphere to prevent formation of impurities.

The result is an amazingly tough and durable cable with precisely centered conductors that withstands mechanical abuse, water, oil, grease, gasoline, ozone, heat and cold. Ask your AS&W salesman for the story . . . and a catalog.

AMERICAN STEEL & WIRE DIVISION
United States Steel, General Offices: Cleveland, O.
Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, New York

The workman is holding an electric concrete tamper that knocks the entrapped air out of the mix before it sets—giving a denser, stronger concrete. The tamper is equipped with Tiger Brand Amerclad. It's dragged through wet concrete, over piling and beams, run over by trucks. Yet the manufacturer says he has never had a complaint about the cable.

Watch the **United States Steel Hour** on TV every other Wednesday (10 p.m. Eastern time).

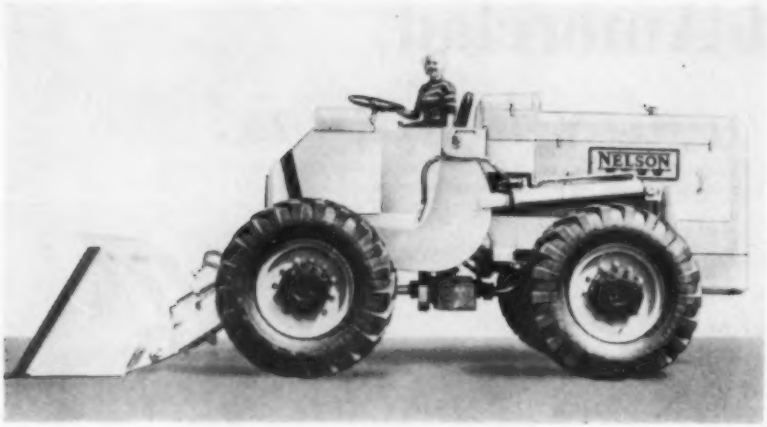
USS TIGER BRAND ELECTRICAL WIRE & CABLE

a standard Tiger Brand cable for every special job

- Asbestos Wire and Cable
- Mold Cured Portable Cord
- Shovel & Dredge Cable
- Paper & Lead Cable
- Varnished Cambric Cable
- Interlocked Armor Cable
- Special Purpose Wire & Cable
- Aerial, Underground and Submarine Cable

UNITED STATES STEEL

USS TRADEMARK



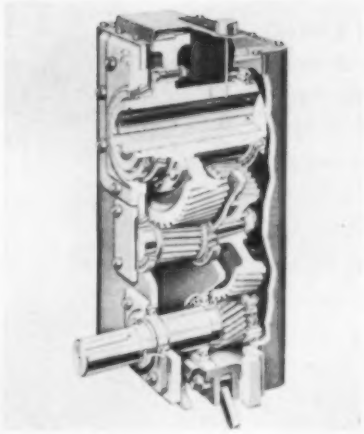
● N. P. Nelson Iron Works has introduced a new 2¼ cu. yd. tractor shovel, the Model 200.

Features include underslung arms for greater visibility and safety, an Allison Torqmatic full reversing transmission with a 3.5 to 1 stall ratio, and four-wheel drive Timken-Detroit planetary axles with torque proportioning differential to give maximum traction.

The bucket has a maximum dumping height of 9 ft. 6 in., a forward reach of 5 ft 7 in. at dumping height of 7 ft., and 40 deg. tipback at ground level. **(314)**

● Model FDT-270, a 27-cu. yd. capacity frameless dump trailer, is the latest addition to the line of dump bodies and hydraulic hoists designed and manufactured by the Marion Metal Products Company.

The 24-ft. tandem axle body is hydraulically raised with a Marion F-715-T-180 front end telescopic hoist. The trailer is also available with single axle and in capacities and lengths to permit maximum legal payloads. **(315)**



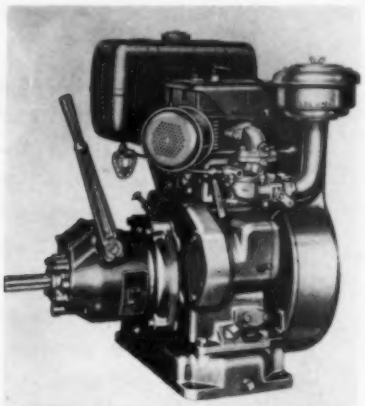
● The Falk Corporation is producing a new, larger capacity shaft mounted drive, the 315J. The drive is available in single reduction ratio of 5:1 and in two double reduction ratios of 14:1 or 25:1. Unit ratings range from 2 hp. at 5 r.p.m. to 50 hp. at 359 r.p.m.; maximum torque rating at low speed shaft is 31,000 p.s.i.

A longer distance between shafts permits the use of larger sheaves on installations in which the unit is mounted with input shaft toward driven machine or on through-shaft applications. Inspection covers on the three-wall one-piece all steel housing provide easy inspection of bearings and helical gears. An automotive type dip stick is provided for a quick check of oil level. **(316)**

● The Wisconsin Motor Corporation announces its new four - cycle single - cylinder engine, the Model AGN, rated at 12½ hp. The new Model AGN has a speed range from 1,600 to 3,200 r.p.m., and has a piston displacement of 38.5 cu. in.

According to the manufacturer, the basic high torque of the Model AGN provides the load-holding lugging power which resists r.p.m. slowdowns under sudden shock loads, prevents stalling, and permits a quick power recovery.

In addition to the 12½ hp. Model AGN, Wisconsin four - cycle single



cylinder engines are supplied in several other sizes, ranging from 3 to 9 hp. Other models include two-cylinder and V - type four - cylinder sizes from 10 to 56½ hp. **(317)**

● Wm. W. Lee and Son offers the Leelights BL-64 LP gas floodlight, a self-contained, totally weatherized unit which is completely portable. The BL-64 will provide a white light of 6,000 candle power at maximum of 15 lb. pressure for 50 hours on a 20 lb. tank of LP gas, or for 150 hours on 3 lb. pressure, throwing a beam approximately 100 by 250 ft.

The BL-64 can be instantly lighted with a match or Shoot-a-Lite igniter. It is unaffected by weather and will operate in temperatures down to 40 deg. below zero. For safety purposes, a 300 lb. test Neoprene hose is used. All fittings have been designed and tested for LP gas. **(318)**

looking for

BIG TONNAGES

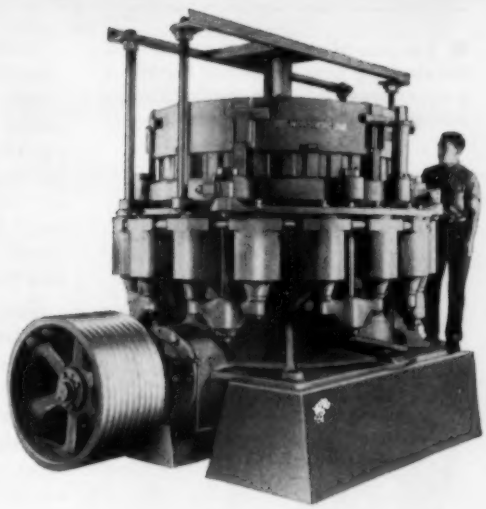
of finely crushed product?

...then you need the Gyradisc® CRUSHER

HERE *you see a handful of specification sand made by the Gyradisc Crusher . . . from a Pea Gravel feed, previously considered a "costly, difficult material to crush."*

This is but one example of what producers may expect of the Gyradisc Crusher . . . but more important, the Gyradisc in most cases substantially reduces the cost of producing a finely crushed product . . . such as manufactured sand or other specification material from a minus ¾" feed of crushed stone or Pea Gravel.

The Gyradisc Crusher is designed specifically for the low cost, large volume production of fines. If you are faced with a critical shortage of fine material, want to expand your market or want a profitable solution to the problem of handling and disposing of excessive Pea Gravel or other unsaleable material . . . it will pay you to investigate the Gyradisc. It has benefited other operators and may help you. *Nordberg Mfg. Co., Milwaukee, Wisconsin.*



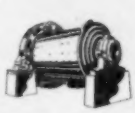
Built to supplement the Symons® Cone Crusher, the 54" Gyradisc Crusher is providing volume production of still finer specification material. It is currently being used for the production of many materials such as agricultural limestone, limestone chips, sand, rock dust, crushed stone for asphalt mix and the fine reduction of asbestos and talc. *Write for Bulletin 228.*

SYMONS . . . *A Registered Nordberg Trademark Known Throughout the World.*

Enter 57 on card, page 101

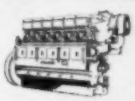
Symons Gyratory and Cone Crushers

Nordberg Grinding Mills



Symons Vibrating Grizzlies and Screens

Nordberg Engines . 10 to over 12,000 hp.



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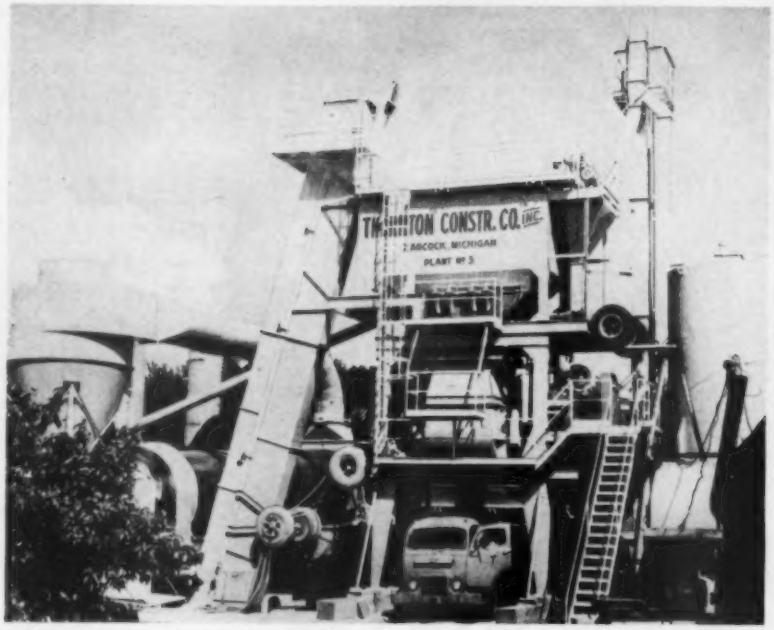
C257

● Complete portability and fully automatic operation are features of this new Madsen Model 481 6,000-lb. batch capacity asphalt plant. The unit is capable of turning out over 200 t.p.h.

By pressing a single button, the operator can weigh out four sizes of aggregate, weigh out the asphalt, discharge aggregates into the mixer, dry mix the aggregates, inject the asphalt, wet mix for a pre-determined length of time, and discharge the mix into the dump truck. The unit will re-cycle up to 400 batches. A choice of three specification mixes can be made by flipping the selector switch to the mix desired.

This plant incorporates a four-compartment, 50-ton capacity bin. The weigh-box has a gross level full capacity of 120 cu. ft. and a working capacity of 100 cu. ft. The Madsen Model 440 twin shaft pug mill mixer is used in the Model 481 plant. This 6,000 lb. mixer has a capacity of 64 cu. ft. below the center line of the mixing shafts and a 135 cu. ft. net capacity level full.

Also furnished with the Model 481 is a Madsen 96-in. diameter by 40 ft. long dryer, which is capable of drying over 180 t.p.h. of aggergates to a .018 percent moisture content. The plant is also equipped with a 12 ft. diameter cyclone dust collector, a heavy-duty Madsen exhauster, and a Madsen triple wet tube dust washer. (319)



● Johnson-March Corporation has developed a new integrated chemical proportioner which automatically mixes and pumps surface active solution for liquid dust control. Known as the Type S liquid proportioner, the unit is used with the latest of the company's Chem-Jet liquid dust control systems.

In operation, the proportioner measures and pumps the surface active concentrate into the water, pipes the mixed solution into the ready storage tank, and then conveys the final liquid at variable rates of flow to the points of application in the dust control system.

Among the features of the Type S proportioner is a dual tank system which offers almost three times the usable storage capacity formerly available for the mixed Compound MR-water solution. The pump, motor, and proportioner are incorporated in one heavy gauge steel housing to conserve space and to protect the equipment against damage.

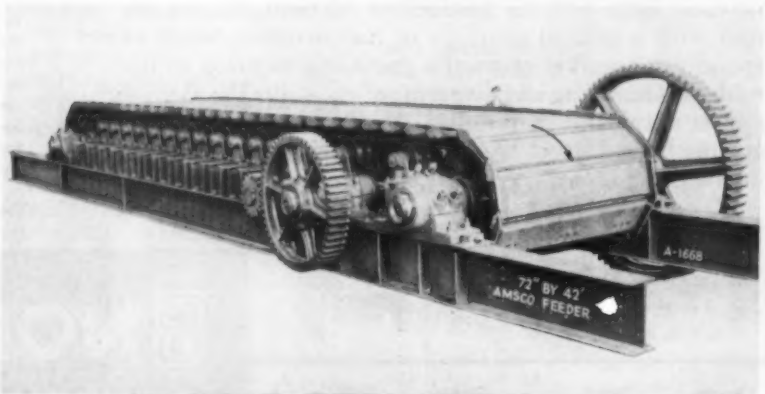
The unit is equipped with a newly-designed microbellows type pump which gives precise control over the amount of compound proportioned into the water line.

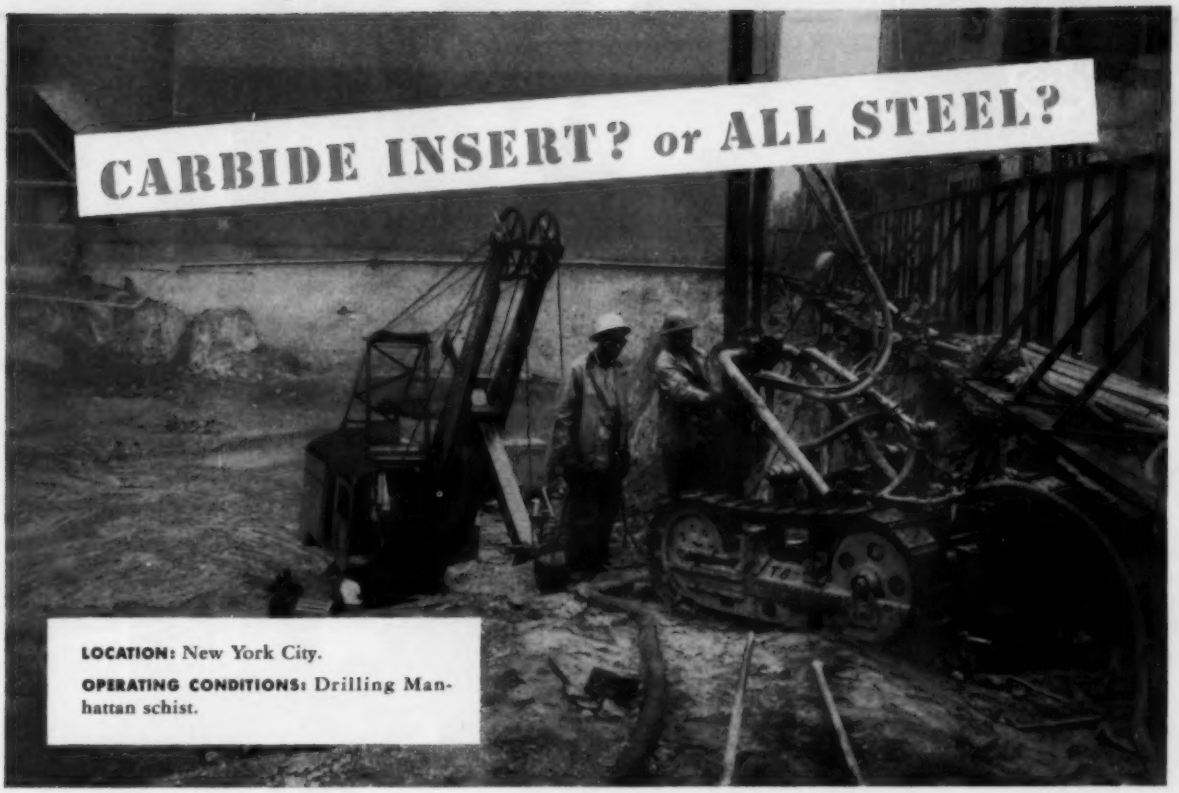
Units are available in capacities ranging from 0 to 50 g.p.m. and 40 to 100 g.p.m. ←(320)

● This giant AMSCO feeder, recently completed by the Stephens-Adamson Mfg. Company, is of a type used to receive ore and stone from storage bins or hoppers, feeding it to conveying and crushing facilities.

The feeder is basically a heavy-duty machine consisting of a series of manganese steel pans, designed to carry ore for comparatively short distances over horizontal or reasonably inclined planes. The pans ride on two parallel endless chains also made of manganese steel.

The big feeder will handle 550 tons of ore per hour. It weighs approximately 180,000 lb., is 72 in. wide, with 46 ft. centers, and 10 ft. high. (321)





"We get faster drilling with fewer bit changes using TIMKEN® carbide insert bits"

. . . Reports Slattery Contracting Co., Inc.

EXCAVATING for the new TIME-LIFE Building in New York City, Slattery Contracting Company, Inc., had to drill extremely deep, constant gage holes through hard, abrasive Manhattan schist. They held bit changes to a minimum, stepped up drilling speed and got lowest cost per foot-of-hole with Timken® threaded carbide insert bits.

For jobs like this you'll find that Timken carbide insert bits give maximum speed and economy.

Yet carbide insert bits aren't always best for every drilling job. In softer, less abrasive ground Timken all steel multi-use bits are your best bet. With correct and controlled reconditioning, they hold your cost per foot-of-hole to a minimum in ordinary ground when full increments of steel can be drilled.

Your drillers save time with either Timken carbide insert bits or all steel multi-use. Both are interchangeable in the same thread series, and dozens of different bits fit the same drill steel. Bits can be changed easily and quickly—right on the job!

All Timken rock bits are made from our own fine alloy, electric furnace steel. And to protect their threads against drilling impacts, Timken bits have a specially developed shoulder union.

So why not get all these advantages on your next drilling job? To make sure you get the type of Timken bit that meets your particular needs, just call or write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

Timken threaded all steel multi-use rock bit

Timken threaded carbide insert rock bit

TIMKEN *your best bet for the best bit for every job*

TRADE-MARK REG. U. S. PAT. OFF.

Enter 59 on card, page 101

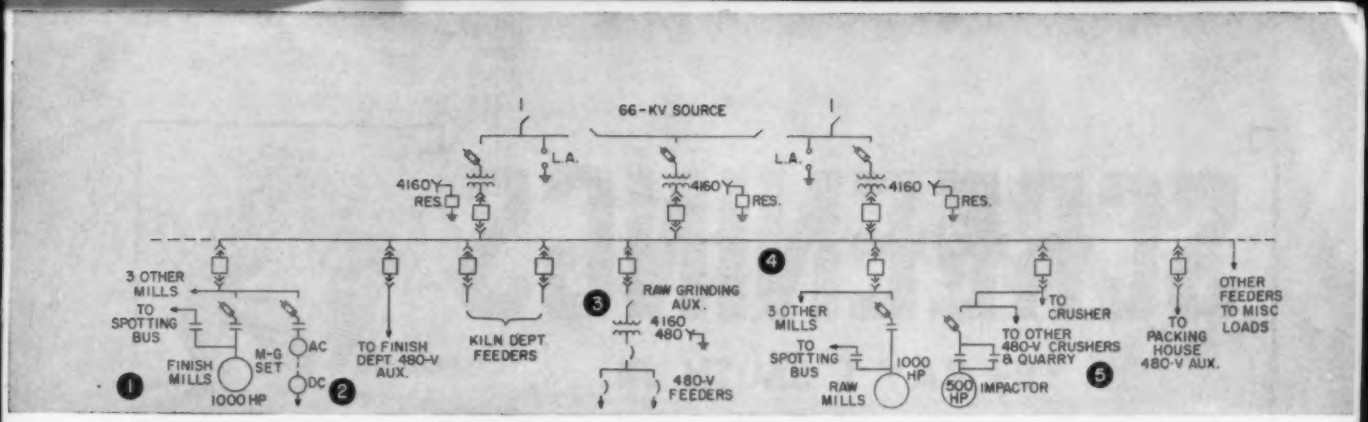
ENGINEERING REPORTS:

1 **DRIVING BALL MILLS,** are eight G-E 1000-hp synchronous motors. Spotting features facilitate ball replacement.

2 **SMOOTH KILN SPEED CONTROL** is achieved with G-E d-c drives. These highly reliable 125-hp dripproof motors employ a 3:1 speed range.

3 **DUST PROTECTION,** for G-E load-center unit substations which supply 480-v operating power to raw and finish grinding department auxiliaries, is provided by this separately ventilated and pressurized control room.

Enter 60 on card, page 101



Lone Star's Nazareth plant "grows" into new quarters, boosts capacity 65%

General Electric system-engineered equipment helps solve power distribution problems, meets rugged mill drive requirements

To meet increased cement demands of areas served by Lehigh Valley producers and to reduce production costs, Lone Star Cement Co. is modernizing and expanding its Nazareth, Pa. plant. And they are doing it in a well planned manner—not by overcrowding and overloading present facilities—but by constructing an adjacent, modern plant and "growing" into it. This has increased capacity from 6000 to 10,000 bpd with virtually uninterrupted production.

GENERAL ELECTRIC ENGINEERS worked with Lone Star in designing a power distribution system which reduces costs by minimizing voltage drop and initial investment, and by getting maximum efficiency from operating equipment. To carefully integrate the power system with rugged ball-mill torque and speed requirements, G-E engineers helped specify characteristics needed for eight 1000-hp, 4000-v, high-torque G-E drives in the raw and finish departments.

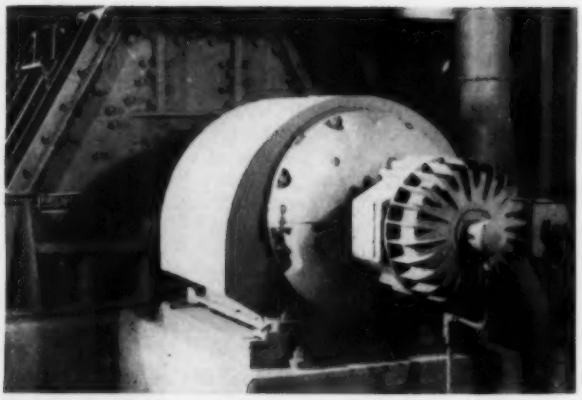
CENTRALIZED CONTROL is a modern feature of the new facilities. Ball-mill control, 480-v grinding department load-center unit substations, and plant 4160-v metal-clad switchgear are all located in one pressurized room adjacent to the ball mills.

WHEN YOU PLAN TO EXPAND OR MODERNIZE, take advantage of G-E engineering services. Contact your nearest General Electric Apparatus Sales Office. General Electric Company, Schenectady, N. Y. 658-21

Engineered Electrical Systems for the Rock Products Industry

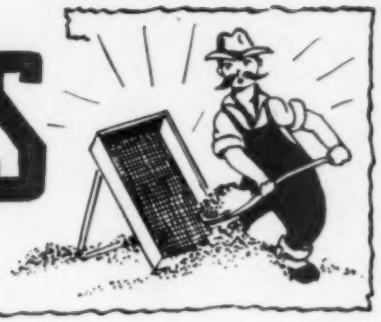
GENERAL ELECTRIC

4 DISTRIBUTING POWER to all mill departments is this lineup of G-E 4160-v metal-clad switchgear. Dependable system protection is provided by its 250-mva interrupting capacity.



5 HEAVY STARTING requirements of reversible impactor for secondary crushing are matched with powerful G-E 500-hp wound-rotor induction motor with enclosed collector rings.

SCREENINGS



By RAY L. SMITH JR.

IT IS WELL known that a bird or a customer in the hand is worth two in the bush. Yet customers, like birds, fly away unless we keep a firm grasp on them. So the following story by Harold J. Ashe, who engineered the article on page 121, is offered for your enjoyment. Thank you very kindly, Harold.

Ornithologists mourn the extinct passenger pigeon, blame this on man's destructiveness and not natural causes. This is true but it does not reveal the full story. Here for the first time in print is the story behind the story, offered for whatever it may be worth. Any similarity between the passenger pigeon behavior and certain current business practices is no coincidence.

Back in the early 1800's, so goes an old Indian legend, a great Indian medicine man had a revelation. In it, the Great Spirit told him that the braves who died in battle weren't making it from here to there. The Great Spirit proposed a daring scheme to correct this tragic situation in which, in a sense, the spirits were neither here nor there. He instructed the medicine man to shop around, hire some passenger pigeons as air transport, one spirit to each passenger pigeon. As the spirits, even when they were high, weighed nothing, they were no burden, even for a passenger pigeon.

Acting on such unimpeachable authority, the medicine man promptly put the scheme into operation. Objective: Get the spirits air borne. He called on several passenger pigeon covey leaders, asked for prices, with the transport job to go to the one who'd cut his prices lowest. Each bidder was given specifications and a flight plan showing the altitude and distance to delivery point, the Happy Hunting Grounds.

Price per spirit ran from a high of ten grubs to a low of three grubs. The three-grub bidder got the job. Naturally! Who else?

A few days later, after a particularly disastrous battle which considerably increased the tribe's spirits while lowering its morale, the medicine man again invoked the aid of the Great Spirit. He got a dressing down that reduced him to his breech clout. The Great Spirit was grievously disappointed in his emissary. There were a mounting number of spirits who weren't getting through. His chief bookkeeper complained there were too many spirits receivable being carried on the books. How about stepping up deliveries?

So the medicine man called the successful bidder on the carpet. How come?

"Well, it's like this," said the boss passenger pigeon, "we just can't make it from here to there on three grubs. That isn't even half a grub steak. So we drop our cargo over a place we've named, ahem, Spirit Lake and head for home like any decent pigeon would do."

"Didn't you look at the specifications and study the flight plan?" asked the irate medicine man.

"Well, yes, in a way," replied the pigeon, pouting as he heaved his breast defensively.

" What do you mean, in a way?" snarled the medicine man.

"We knew we couldn't get there and back on three grubs, but we figured we could work out a shortcut or two, and volume would cut our overhead. There weren't any, and it didn't. The route was as straight as a bird can fly, and that's awful straight, as any pigeon ought to know."

"Why didn't you charge more, ask enough grubs to do the job, make a profit for your trouble?"

"If we had," sighed the pigeon, "some other bird would have got the business. We wanted to close that deal in the worst sort of way, and that's what we did. We figured if we cut our price low enough we'd get the business." With that he buried his head in his wing, muttering to himself, "we sure did, we sure did!"

The medicine man flipped the intercom button and reported to the Great Spirit. The Great Spirit Huffed a Great Huff that shook the woods out of a year's tree rings, scaring the daylights out of some probationary spirits who had only tourists revocable hunting licenses. He uttered a Great Curse on all passenger pigeons. He decreed they all must die at the hands of the white man, the Indian's mortal enemy, than which he could think of no worse fate. And, so it came to pass, the passenger pigeons no longer pass across the land. They've quoted their last low, low price to close a sale.

Potpourri and Succotash

"I spanked junior," said the woman indignantly, "because he was very rude. He called me a big fat pig."

"Well, spanking won't do any good," replied her husband. "What you should do is go on a diet."

Two travelers lost in a snow storm in the Alps were found by a Saint Bernard equipped with the usual cask of brandy.

The first to see the dog approach grasped his companion by the arm: "Look! At last! Man's best friend!"

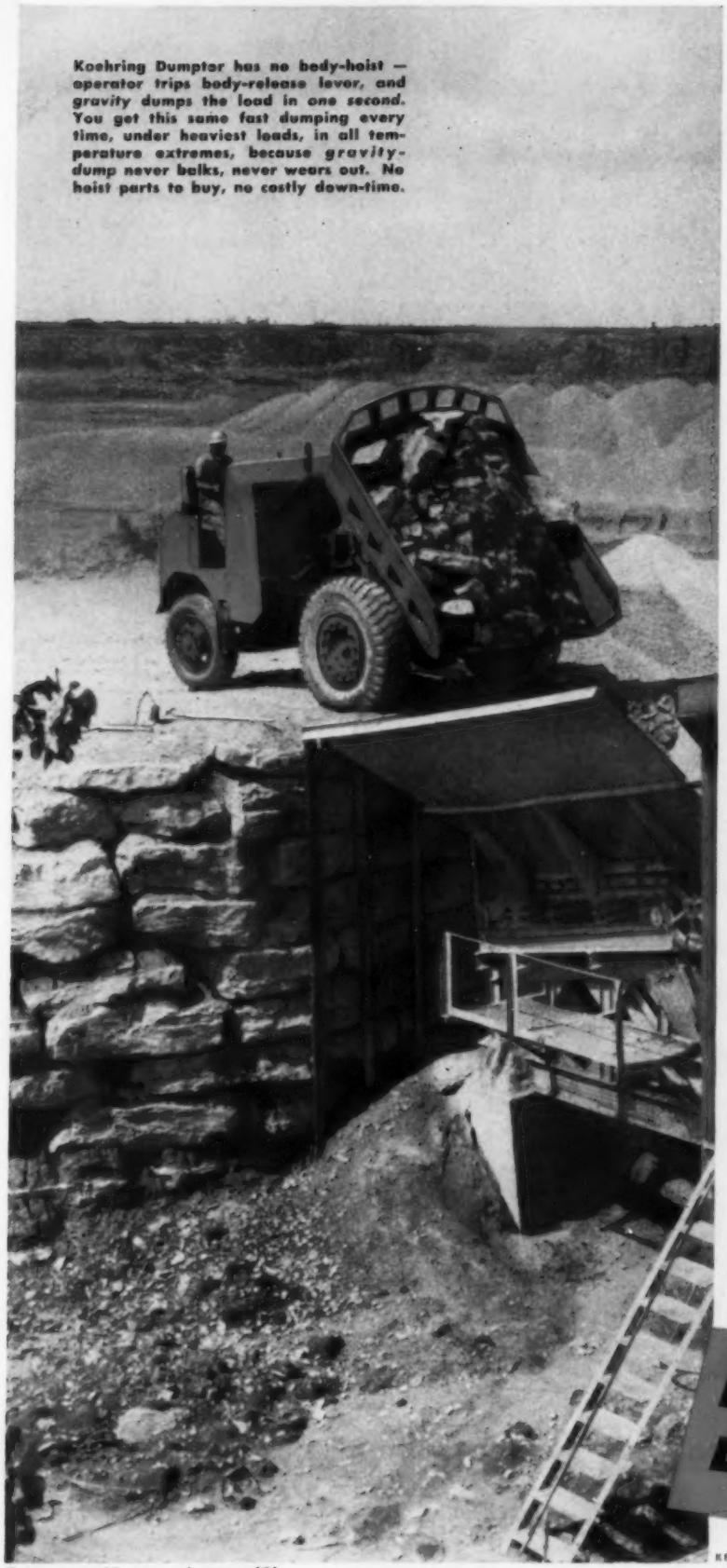
"Yes and look," cried the other, "a dog is carrying it."

It appears that a dog was being offered for sale at an auction and a man in the back of the crowd, liking its appearance, was finally the successful bidder. However, he had to pay a pretty high price as there was someone in the front of the room bidding against him.

He was a little chagrined at having paid so much but went forward to claim the dog and was surprised to get the bill of sale for "one talking dog."

"You mean this dog can talk?" he said.

"Who do you think was bidding against you?" replied the auctioneer.



Koehring Dumptor has no body-hoist — operator trips body-release lever, and *gravity* dumps the load in *one second*. You get this same fast dumping every time, under heaviest loads, in all temperature extremes, because *gravity*-dump never balks, never wears out. No hoist parts to buy, no costly down-time.

K814

HERE'S

A TON OF STRENGTH

FOR EVERY TON OF PAYLOAD CAPACITY

When it comes to dependable performance under rugged off-road hauling conditions, Koehring® heavy-duty Dumptor® is in a class by itself. All welded 6-yard body, built for rock, has rib-reinforced sides and ends. Top edge is of box beam construction. Bottom is lined with multiple steel beams that cushion the impact of heavy loading. Bolted or free-swinging kick-out pan adds another ½-inch steel plate to Dumptor bottom.

There's plenty of strength, too, in the heavily-trussed chassis to take constant pounding of rough off-road hauling. Steering axle oscillates 21 inches, keeps twists and strains away from main frame. There are no leaf springs — just one big snubber-type chassis spring on steering axle — none on the drive axle. Big, shock-absorbing drive tires eliminate the need for more springs — save on spring maintenance. It's heavy-duty construction like this — in the body, in the heavily-trussed chassis on which it rides — that adds up to "a ton of Dumptor strength for every ton of payload capacity."

Even with all this heavy-duty strength, Dumptor still has more than 6 H.P. for every ton of loaded weight. It accelerates fast, climbs 24% grades fully loaded. If you have a tough hauling problem, see your Koehring distributor about this heavy-duty 6-yard Dumptor. Why not call him right now?

KOEHRING
DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

KOEHRING® DUMPTOR®

KOEHRING K HEAVY DUTY

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Toughest....Strongest

Specify Generals on your new equipment

THE GENERAL TRUCK TIRE

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M MINING

- built with NYGEN®
- deeper huskier TREAD
- crawler-like FLOTATION
- low rolling RESISTANCE
- grouser-type TRACTION

No matter what the job, weather, or terrain, this big husky new General LCM is your assurance of dependable, profitable all-round performance.

Featuring the amazing strength of Nygen cord plus a wider and heavier tread, this great new LCM gives you flotation and traction beyond all comparison.

Choose your toughest job and then choose the dependable, deep-bite performance of the all new General LCM.

THE GENERAL TIRE & RUBBER COMPANY
Akron, Ohio

Labor Developments

Congressional Action

DESPITE all the hullabaloo that has been raised about improper activities in the labor and management field, it does not look as though this Congress will do very much about the problem. It appears that very little legislation will be introduced on the subject. At the moment, the Administration's objective is very limited, indeed. Its recommendations deal primarily with somewhat better reporting of the financial position of trade unions and of the finances of health and welfare and pension plans.

The general feeling appears to be that if reports are made to the government which union members can see upon application, or if reports have to be published, that this practice will have a substantial policing effect. There is no lack of cynics who freely point out that most union members are not adequately trained; that they cannot even understand such reports, and that they are certainly not capable of analyzing them and finding much of the kind of fraudulent activities uncovered by the recent Congressional Committee hearings.

The only other strong pressure for legislation comes from those who would like to see the activities of trade unions subjected to the restrictions of anti-trust legislation. This trend is being actively opposed by the Administration. However, there is a possibility that this opposition will lessen if, in fact, the large volume of labor unrest predicted for 1958 actually comes to pass.

1958—a Year of Labor Turmoil?

The current business decline, rather than weakening organized labor's demands for substantial wage increases, has actually strengthened them. This results from the fact that labor leaders, more than any other group in our society, have fully accepted the philosophy that the principal factor in creating economic recession is a deficiency of consumer

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations

Washington, D. C.-Philadelphia, Pa.

purchasing power. They argue, not unself-servingly, that the only good way to come out of an economic downturn is to increase consumer purchasing power by raising wages. Even the most analytical of the labor leaders appear to have convinced themselves of the wisdom of the position that when times are good, wages should be raised. This should be done, they say, not only to permit workers to share in the prosperity, but also to maintain the *status quo*. When times are bad, they say, wages should be raised so as to restore prosperity.

Whether this curious argument is economically valid or not may be quite beside the point in 1958. Good or bad, strong labor unions appear to be ready to act in conformity with this view. From present indications, the battle will be fought out first in the automobile industry.

Walter Reuther has been warning the industry for some time that, when their contracts expire in 1958, he will expect sizable concessions both in terms of wage and fringe benefits. This strategy of setting the stage well in advance of the negotiation worked very well for Reuther some years ago. It is to be hoped that he will recognize the difference between the economic environment of that day and the present and, also, that he will be able to act in conformity with that recognition despite the obvious pressures upon him from inside his union.

When Mr. Reuther won his very substantial concessions from the auto industry, including his form of the "guaranteed annual wage," the industry was enjoying unprecedented prosperity. He managed to become the beneficiary of the fight for leadership between Ford and General Motors. Neither contender wanted to risk a strike and, therefore, each was willing to give the employees pretty much what they wanted.

The situation in 1958, of course, is quite different. Perhaps the inventory of new automobiles has never before been quite so high as it is now. Moreover, it does not appear that this inventory can be worked off and production levels maintained. The public does not seem to be clamoring for the new models; and, furthermore, economic conditions being what they are, it is unlikely that a demand will develop.

Nevertheless, the danger of a lengthy strike in the automobile industry can not be fully discounted. One of the complicating factors in the situation is the fact that the automobile workers' principal adversary in their home territory, Detroit, is the much-maligned and indicted Jimmy Hoffa, president-elect of the recently expelled Teamsters Union. Despite all of his other difficulties, Hoffa appears able to negotiate very sizable wage increases for his Teamster constituents.

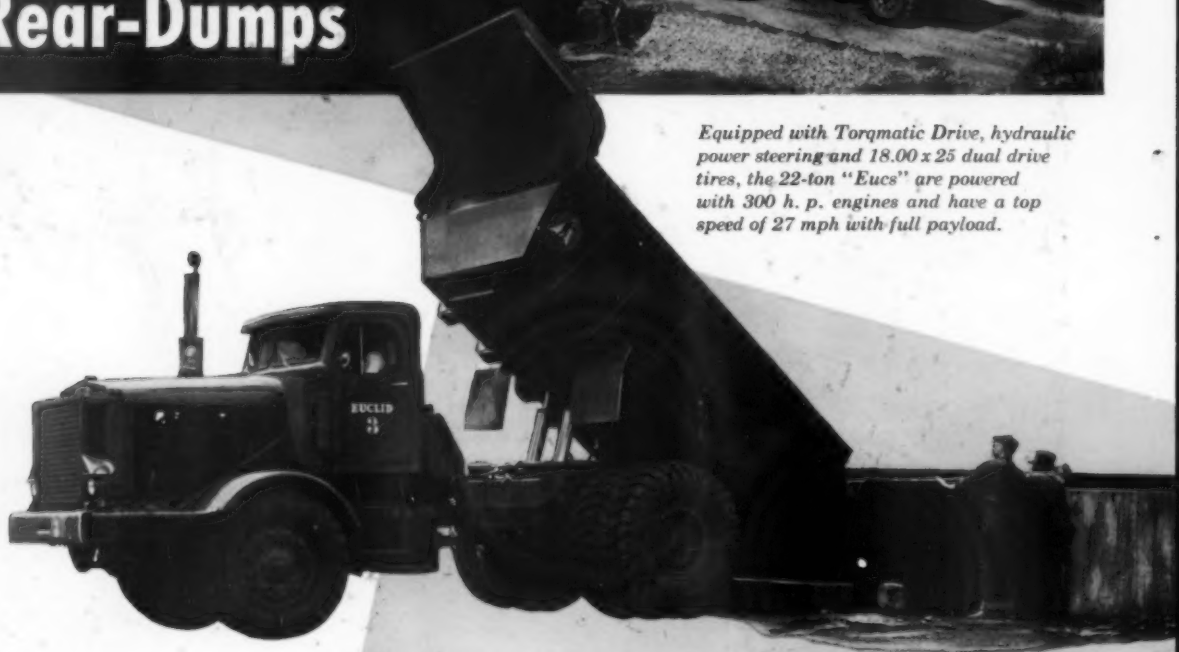
If employers can permit this least respectable of labor leaders to achieve such extraordinary results, Reuther, who regards himself as among the most respectable, is unlikely to be willing to settle for much less. This is a large part of the source of the danger. However, if some formula can be worked out which would prevent an extended strike in the automobile industry, this would probably have very salutary effects everywhere else. Otherwise, a whole series of labor difficulties may follow in the wake of trouble in the automobile industry.

Particularly if the present predictions of economic recession right through 1958 are accurate, the consequences of such strikes would be serious. Strikes not only force unemployment upon those who are directly involved, but also upon a host of other workers—those who supply the striking establishments; those who work on successive stages of production, shipping, distribution and selling of the output of such establishments; and the large number of persons who are employed in producing items bought by those whose employment has been adversely affected.

TRI-CONE
Hughes sets
rock bit standards
the world over
HUGHES TOOL COMPANY

87% Availability with "Euc" Rear-Dumps

Equipped with Torqmatic Drive, hydraulic power steering and 18.00 x 25 dual drive tires, the 22-ton "Eucs" are powered with 300 h. p. engines and have a top speed of 27 mph with full payload.



Five Euclids haul 2500 tons of rock daily for Dragon Cement Co.

Steady production is maintained at Dragon Cement Company in Northampton, Pennsylvania with a haulage fleet of six 22-ton Rear-Dump Euclids. Simple, rugged construction and a thorough preventive maintenance program have enabled these reliable haulers to post an 87% availability record. Depending on production requirements, four or five of the "Eucs" work an average of 6 hours per day each, with either one or two held for standby service.

Assistant Plant Manager F. J. Anderson reports that the Euclids are loaded by two 2½ yd. shovels and haul an average of 2500 tons of cement rock daily to the dumping spot over a mile away. Loads are dumped into the 35-ton hopper in 30-45 seconds. Total time for the 2¼ mile trip from loading shovel to hopper and return averages 11 minutes.

The dependable performance of "Eucs"—job-proved on hundreds of mine, quarry and industrial operations—results in more work done at lower cost per ton. Your nearby Euclid dealer will be glad to provide you with facts and figures on the complete line of Euclid earthmoving equipment . . . and show you why ***Euclids are your best investment.***

•

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Enter 68 on card, page 101

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

Many of the trade unions which are likely to become involved in these difficulties in 1958 have had little or no experience with large-scale strikes in periods of economic recession. A history of the labor movement will indicate that most unions come out of such strikes far weaker than when they went into them. This is a lesson that may have to be learned the hard way. Nevertheless, if the trade unions are weakened by their activities this year, this will only add further to some other recent developments which have adversely affected their bargaining power.

Hot Cargo Clauses

One of the most potent weapons, particularly of the Teamsters Union, has been the inclusion of so-called hot cargo clauses in their contracts with various truck lines. These clauses have been included in virtually all of the contracts, including those with common carriers.

Hot cargo clauses are, of course, provisions which require the employer to refuse to accept certain merchandise for shipment. Generally, this is merchandise which is delivered by a trucking line whose employees are not organized by the same union.

When the Taft-Hartley Act was first passed, it was frequently supposed that such clauses were illegal because they eventually involved the imposition of secondary boycotts. However, a series of cases before the National Labor Relations Board failed to establish this conclusion, although that Board had made some decisions which seemed to establish the proposition that such clauses are illegal in contracts with common carriers. Nevertheless, many of the common carrier truck lines continued to enforce them because they valued their relationship with the union far greater than their relationship with a few fringe truck lines whose employees were not similarly organized.

It was very difficult for an unorganized truck line to fight this kind of discrimination until recently, when the Interstate Commerce Commission ruled that common carriers by motor vehicle may not avoid their statutory obligation to serve the public through bargaining hot cargo clauses in their union contracts. In its report the Commission said, "We think it beyond doubt that the Interstate Commerce Act imposes upon common carriers by motor vehicle subject to our jurisdiction, the clear and unmistakable duty to provide adequate service, equipment, and facilities for the transportation of property in interstate or foreign commerce within the scope of their holding out to the public."

The Commission did not rule directly on the legality of hot cargo clauses, since it has no authority to do that. However, it threatened any common carrier who enforced such a clause with the loss of his license. Now, for the first time, such truck lines have more to lose by enforcing such clauses than by disregarding them.

The net effect of this action is likely to be the elimination of one of the important bases for this phase of union power. When this fact is added to recent limitations on the right to picket for any and all reasons, it will be seen that even without changes in legislation, various government actions have whittled down many of the weapons used by the least scrupulous of the labor unions.

Use of Non-Union Building Sub-Contractives

In the building construction industry, a similar whittling down of a favorite weapon has occurred. The National Labor Relations Board ruled that a union, as well as a contractor's association, violated the Taft-Hartley Act when the union succeeded, by strike action, in forcing the removal of a subcontractor's employees from a construction contract because they were not members of the union, which, incidentally, was required by a contract between the union and the association. In this case, the subcontractor had a contract with another union covering his employees. However, it is likely the ruling would have been the same even if they were not so organized with this union.

Washington News

(*From page* 12)

government increases the price level, it is tantamount to borrowing from its own people, because it is making it less possible for those people to purchase the things they need, and making it more possible for the government to purchase what it needs. In one way or another, the living standard is reduced.

The choice really means this—that living standards must decline. This is true whether we make the simpler choice of just engaging in an arms race or the more complex one of trying in addition to influence and organize the world for peace. The former requires reducing our standards of living so that we may be able to devote large resources to defense; the latter requires reducing our standards of living so that we may devote large resources not only to defense but also to raising the standard of living of large and remote peoples. However, improvement in our own standard of living has been the strongest pillar in our standard of values. Only in wartime have we been willing to substitute a lower standard, and then only reluctantly.

The next most-important pillar has been freedom in all areas, with special emphasis on the economic area. Here, again, it is the recognition that some of these freedoms are in jeopardy, which is creating the confusion. One of the questions which will be debated is "Are any freedoms to be given up and, if so, to what extent?"

Actually, the question is unlikely to take this simple form. Rather, the subject being discussed in Washington concerns the controls that will be required, particularly in our economy, if we are to achieve any success, regardless of which of the goals is chosen. Here, in Washington, the discussion is not so much about *who* should have controls, as about *when* to apply them.

McMillan Elected President At National A.A.S.H.O. Meeting

At the national convention of the American Association of State Highway Officials held recently in Chicago, C. R. McMillan, chief highway commissioner of South Carolina, was elected president of A.A.S.H.O.

The following regional vice-presidents were named: J. N. Robertson, director of highways (and immediate past president of the American Road Builders Association); M. L. Shadburn, state highway engineer of Georgia; Charles M. Noble, secretary to the governor, in charge of highways, Ohio; and H. D. Mills, state highway engineer of Nevada.

R. R. Bartelsmeyer, chief highway engineer of Illinois, was elected first vice-president of the association.

According to a report from the Organization for European Economic Co-operation, total world consumption of cement in 1956 was 235,000,000 tons. Of this, 30 percent was accounted for by the O.E.E.C. area, which includes Iceland, Switzerland, the German Federal Republic, Belgium-Luxemburg, Sweden, and Austria, 23 percent by the United States, and 47 percent by the rest of the world.

Expanded-Shale Plant of MATERIAL SERVICE

largest of its type in country--built after 5-year study

By BUREN C. HEROD

NEARLY five years of investigation and research — on raw material; on potential plant locations in terms of market, transportation, and reserves; plus laboratory studies of operating techniques and processing from feed to finished product. Result—the first expanded-shale lightweight aggregate plant of its type in the Midwest, and the largest of its kind in the country; basis—an unswerving interest and belief on the part of the management of Material Service Corporation, Chicago, Ill., in the potential for such an operation, as well as the determination to construct the most technically advanced facility possible if conditions warranted.

The firm's new 1,000-1,500 cu. yd. per day, 2-kiln Materialite plant near Ottawa, Ill.—about 60 miles south of Chicago—went into operation about 2 months ago as the culmination of that extensive research and construction project. Incorporating an exceptional flexibility in virtually every processing phase, the plant flow provides for crushing and sizing of the raw shale prior to expansion, rather than the more common practice in lightweight aggregate plants of supplying kilns with a roughly-sized feed, which after expansion is subjected to finish reduction and screening. However, provision is made in the Materialite operation for further reduction and screening of the finished product discharged from the kilns, to accommodate greater demand for specific smaller fractions.

The design for the new plant—structures, equipment locations, and conveying systems — was developed by John F. Meissner Engineers, Inc., Chicago, who have previously undertaken a substantial number of engineering projects for Material Service, as well as bulk materials-handling systems, storage facilities, and plants for other operators.

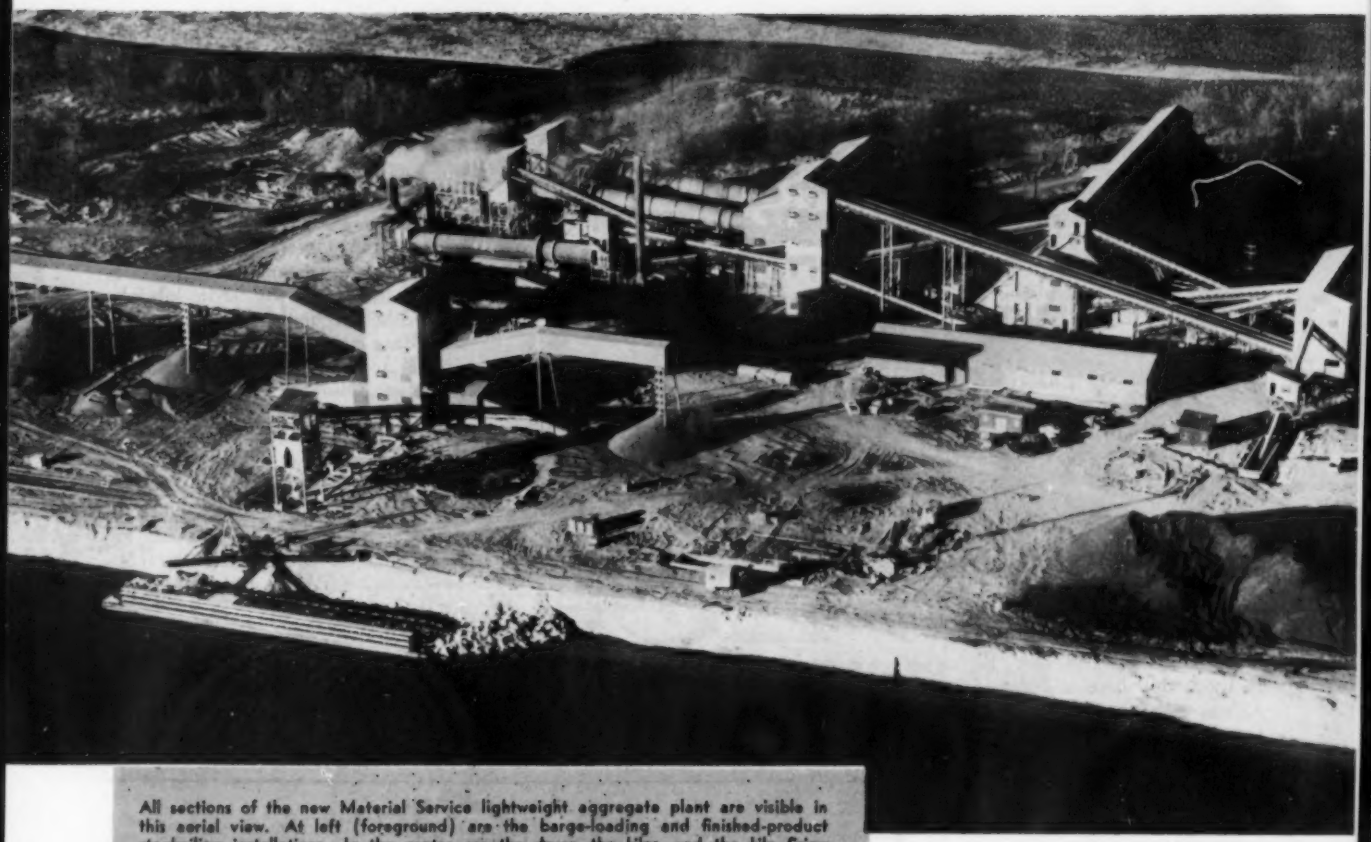
Preliminary layout and design work was initiated about five years ago, and grading of the plant site was started in the fall of 1956. The first foundations were laid early in 1957, and by late summer most processing equipment was in place and the plant was ready for breaking-in operations. Construction was carried out under the supervision of the Materials Service engineering personnel. Resident supervisor for the project was William Moyle, assistant general production manager, who joined the company's staff last year. Mr. Moyle's long previous experience in the cement industry—with Marquette Cement—provides an interesting note in view of the fact that the new lightweight aggregate plant rather closely resembles a cement-producing facility. In fact, only a few modifications would be required in raw material preparation and finished-product handling, plus grinding equipment, to revise the operation into a small cement plant.

• • •

Top quality expanded, coated lightweight aggregate produced in an outstanding new plant with a current daily capacity of 1,500 cu. yd.
Comprehensive testing shows Materialite concrete mixes to equal or surpass standard aggregate mixes in many characteristics.
Highly flexible design involves more than 6,000 ft. of conveying system, three screening and three reduction phases, wide blending range in kiln feed.

• • •

Development While the plant was designed for a normal total output of 1,000 t.p.d. from the two kilns, each of the latter actually has the capacity to attain 30 t.p.h. The basic plant design and layout also provides for the addition of several future kilns and related equipment, as subsequent markets may necessitate, with the minimum of disruption to existing production and processing lines.



All sections of the new Material Service lightweight aggregate plant are visible in this aerial view. At left (foreground) are the barge-loading and finished-product stockpiling installations. In the center are the dryer, the kilns, and the kiln firing building; and to the right of center, in sequence, the raw shale storage building, and the primary crushing and screening building.

As noted above, a careful study of possible plant sites was made — in terms of suitable raw material reserves and the most advantageous transportation factors in relation to the market area. The property finally chosen—over a section of land—is well located with respect to metropolitan arterial highway routes, mainline rail routes; and being on the bank of the Illinois River, it is also served by the company's towboat and barge fleet.

During the last five years the study of various factors involved was aided by tours of several other installations. As a result of that study it was decided to build a plant in which shale is presized prior to kiln feed, and the aggregate produced is well-rounded and has an impervious outer layer or coating, and a vesicular interior. The consequent low absorption, high insulation value, and durability of the finished product were prime considerations in the company's search for comparable raw materials in Illinois.

Raw Material Such were found near Ottawa, and as an additional advantage, this Canton shale deposit is not far from major coal areas, which provide the fuel consumed in the expansion process. Samples of the shale were extensively tested in laboratories of the Illinois Institute of Technology and the Allis-Chalmers Manufacturing Company. Processed through laboratory kilns, the material was found to have the desired qualities on expansion, and the tract acquired contains a reserve sufficient for more than 100 years of operating requirements. A typical analysis of this shale, in place, is as follows:

$Si\ 0_2$	57.35 percent
$F_2\ 0_3$	10.31
$Al_2\ 0_3$	22.61
Mg 0	2.50
$Ti\ 0_2$	1.62
S	0.81

Exhaustive tests on aggregate specimens produced from this shale were made by a research group. Results showed that the pore structure and strength of the material is such that loss in the sodium sulphate soundness test is remarkably low. Contributing to that soundness were the low absorption values obtained. Credit for the latter has been given to the dense skin on each of the aggregate particles. Another significant characteristic reported was that the percentage of loss in the Los Angeles abrasion test was within specification limits of heavy aggregate.

Both stripping of overburden and excavation of the shale are handled by a Marion diesel walking-type dragline equipped with a 5-cu. yd. bucket. Raw shale is hauled from pit to plant by three 22-ton end-dump Euclid trucks. In order to avoid crossing the highway separating the two properties, the company built a two-lane underpass for the haulage traffic.

The elevated truck ramp at the plant feed hopper was constructed to provide sufficient maneuvering room for side-dump tractor-trailer units, as well as for the standard two-axle end-

A careful study of deposits preceded the acquisition of this shale property. The 4-cu. yd. dragline handles stripping of the thin overburden, as well as loading of the haulage units.

dump units now in use. By either method, the shale is dumped into a 45-ton plant feed hopper whose bottom is formed by a heavy-duty feeder.

The feeder, a 60-in. wide Rogers Iron Works Company unit, has 24-ft. centers driven through a Jones speed reducer by a 25-hp. motor. Torque transmission from motor to reducer is provided by multiple V-belts, while the reducer and feeder jack-shaft are chain-connected.

The plant has a total connected horsepower of 2,700, of which the greater part is provided by Allis-Chalmers motors. Jones, Dodge, and Falk speed reducers are used throughout, and are primarily V-belt connected to the power source. With respect to other major components of a type installed at multiple points in the flow, all screens are Allis-Chalmers double- or triple-deck Ripl-Flo units; conveyor trusses, A-frames, and idlers are Barber-Greene equipment; and belting is predominantly Goodrich. All heat-resistant belting in the raw shale dryer and kiln discharge circuits are of Goodyear Rubber Company manufacture.

More than a mile of belt conveying system is installed in the plant, and individual units are referred to by the numbers shown in the accompanying tabulation.

Crushing and Screening On the heavy-duty feeder, the raw shale is transferred to the primary crusher—a McLanahan & Stone 36x72 single roll, driven at 720 r.p.m. by a 200-hp. motor. Rated at 350 t.p.h., the primary has a setting of 4 in. and discharges onto conveyor No. 1. The crusher run is then transferred on conveyors No. 2 and 3 to the raw shale screening stage. Here the flow is split to a pair of 6- by 16-ft. double-deck screens, each fitted with top decks of ½- and 3-in. slotted openings, and lower decks of 4-mesh by ½-in., fitted with Allis-Chalmers heated screencloth.

Shale retained on the top decks is chuted to a 60-in. by 32-ft. job-fabricated belt feeder and carried to the secondary crusher. Secondary reduction is accomplished in a Hammermills, Inc., Bulldog Non-Clog traveling breaker plate crusher driven at 900-r.p.m. by a direct-connected 400-hp. motor. The secondary product is discharged on conveyor No. 1 and is returned to the screens in the system noted above. Due to the recirculating load, each of these first three conveyors has a design capacity of 700 t.p.h.

The above crushing and screening circuits and equipment (plus dry shale and coal screening described later) are housed in a steel framework and sheet-metal-sided structure. De-

Conveyor Data

No.	Belt Width	Length (o.c.)	Capacity (Design Max.)	Hp.	Application
1	36-in.	250 ft.	700 t.p.h.	50	primary crushing, screening circuit
2	36	160	700	40	
3	36	30	700	15	
4	24	170	250	20	raw shale screens to raw storage
5	24	175	250	20	raw shale screens to raw storage
4A	24	215	250	15	raw storage stockpiling
5A	24	40	250	5	raw storage stockpiling
6	24	180	250	15	raw storage reclaim tunnel
7	24	275	90	10	to dryer
8	(16-in. screw)	18		10	
9	30	80	90	10	wire mesh cooling conveyor
10	24	270	250	15	to dried raw storage
11	24	150	250	15	to dried raw storage
12	24	50	250	15	raw storage stockpiling
12A	24	170	250	10	raw storage stockpiling
13	24	240	370	15	raw storage reclaim tunnel
14	24	160	370	30	to dry shale screening
15	24	30	370	10	to dry shale screening
16	24	310	150	15	dry shale screens to kiln feed bins
17	24	320	150	15	
18	24	325	200	20	
16A	24	105	150	10	distribute to kiln feed bins
17A	24	105	150	10	
18A	24	105	200	10	
19, 29	24	220	30	5	kiln feed conveyors
19A, 29A	(shakers)			3	
20 A-D	9-in. screws			10	
21	24	165	150	10	to finished product handling
21A	36	175	550	40	to finished product handling
22	24	155	200	15	gallery conveyor (fines)
23	24	190	200	15	gallery conveyor (medium)
24	24	255	200	15	gallery conveyor (coarse)
25	30	280	300	15	reclaim conveyor (medium, coarse)
26	30	165	300	15	reclaim conveyor (fines)
27	36	135	450	30	to truck bins
27A	36	255	450	25	tunnel to barge dock
28	36	145	550	20	recrush recycling
30	24	320		15	coal storage to coal screen

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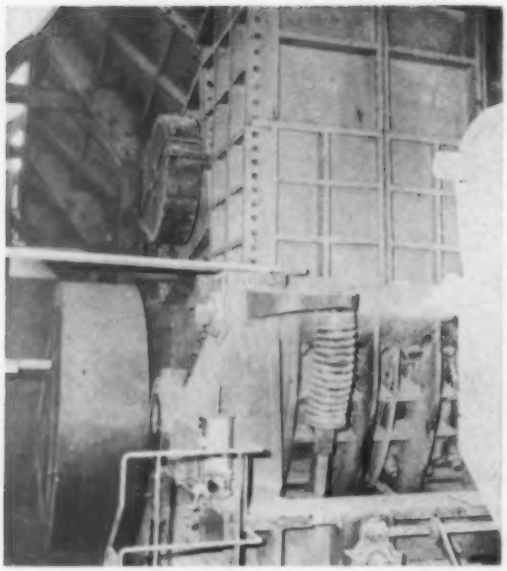
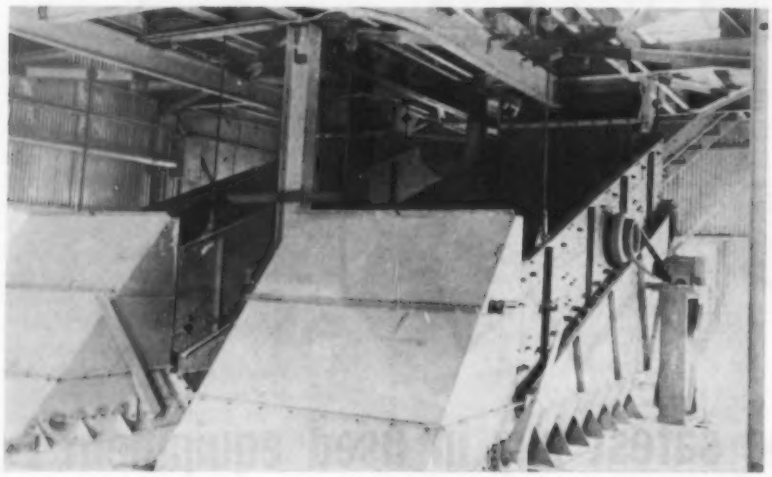
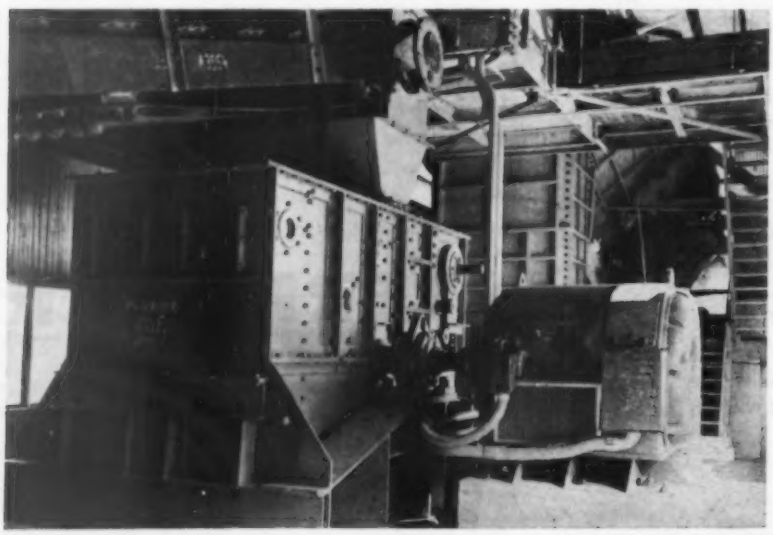


Left: A 60-in. heavy-duty apron feeder transfers shale from the hopper to the single-roll primary crusher.

Above: The ramp from which this truck is dumping into the plant feed hopper will allow traffic of either side- or end-dump haulage units.



After primary crushing, the raw feed is discharged over these two screens. That retained on the top deck is transported to the secondary crusher. Lower decks on both screens are heated.



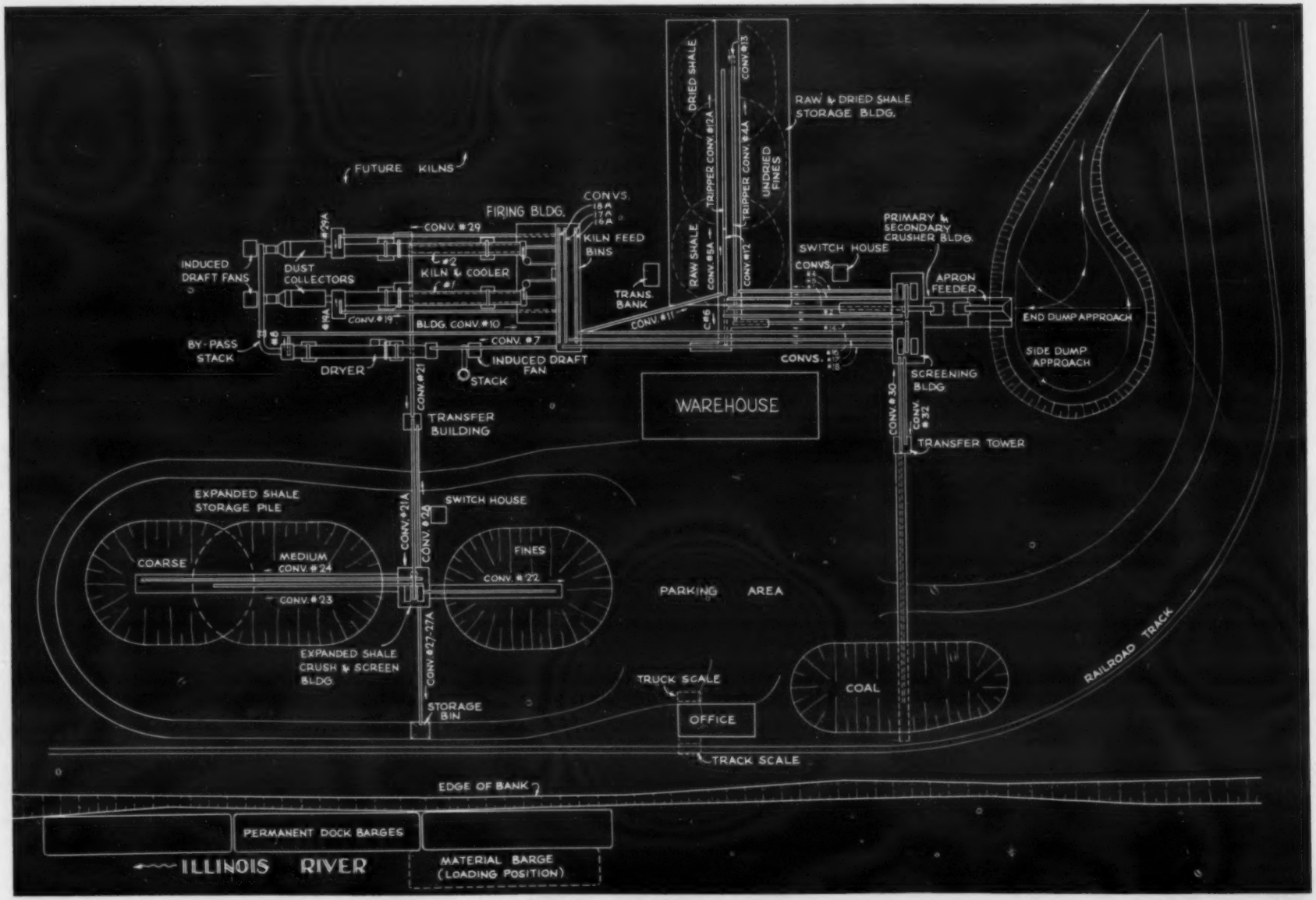
Secondary reduction of the raw shale is accomplished in this traveling breaker plate hammermill.

signed by the Meissner firm, all buildings on the plant site are of similar construction.

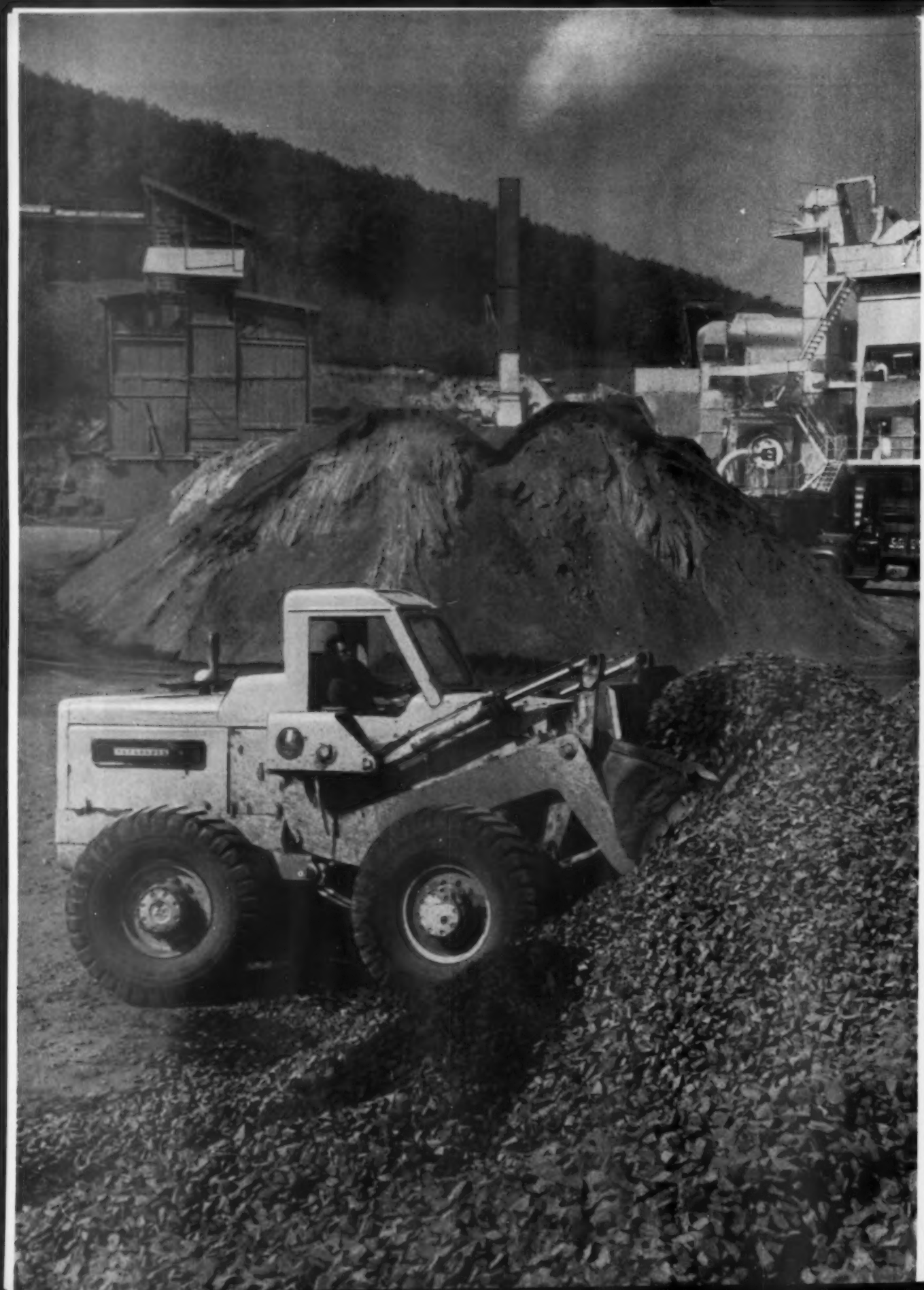
An example of plant design flexibility is found in the flow of materials retained on the lower decks of the two primary screens. While the bottom deck throughs are always chuted to conveyor No. 4 for transport to raw storage, and the top deck retained fraction is recycled to secondary crushing, fractions retained on the bottom decks may be diverted to blend with either of the other two fractions or chuted to conveyor No. 5 for separate transfer to the raw storage building.

Raw Shale Storage The latter structure is of unusual—and efficient — construction. Covering a storage area of approximately 110 by 260 ft., it is built of a series of inverted V frames, or columns, and covered with sheet metal. The frames are rigid and were assembled on the site from sections shipped in by the fabricator. Each leg is butted on an individual concrete footing, and since the frame angle very closely approximates the angle of repose of the raw shale piles, there is practically no waste space. The structure is considered to provide an excellent ratio of unit storage space per dollar of investment.

Running the length of the structure, just below the peak or apex, is a gallery housing conveyors from which the primary screen fractions (two) are stockpiled. Inclined, par-



A plan of the new Materialite plant at Ottawa, Ill.



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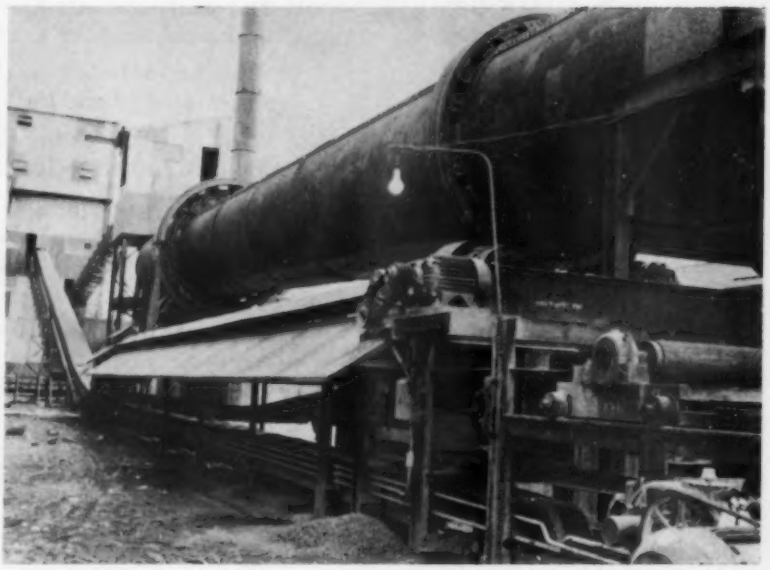
Enter 76 on card, page 101

Left: This photograph of the interior of the raw shale storage building shows some of its interesting features. At the peak is the distributing conveyor gallery. The angle formed by the columns or frames is approximately that of the angle of repose of the material. As a consequence, the shale can be stockpiled practically to the top of the arches.



Hot drying air is provided to the shale dryer by the induced-draft kiln fans, and a booster fan between the dryer and the stack, rear. The shed-type vented roof structure at ground level houses the wire mesh cooling conveyor for dried shale.

allel conveyors No. 4 and 5 enter the top of the raw storage building at right angles to the gallery, and discharge to No. 4A and No. 5A, respectively. No. 4A, equipped with a Link-Belt tripper, receives fines (4-mesh by ½-in.) and distributes these on an underlying lineal pile, while No. 5A receives the coarse fraction and discharges onto a conical pile.

A reclaiming tunnel, 7 ft. high, 14 ft. wide, and 300 ft. long below the raw storage area, houses conveyor No. 13 and No. 6. Along the top of the tunnel are rack and pinion slide gates, on 16-ft. centers, below which feeder cars are spotted. The latter, designed for this project, are rail-mounted and hand-propelled (crank-operated) to desired gate positions. These cars, essentially belt feeders, are equipped with Vari-drives and transfer material from the respective gate in use to the reclaiming belt. The rate of drive on either feeder can be varied to increase or decrease subsequent flow of material.

The raw shale may be drawn from either of the two stockpiles described above for transfer to the drying phase. In current operation the raw coarse shale is transferred from the reclaiming belt to conveyor No. 6, then to No. 7, from which it is discharged to the dryers. Formerly operated as a kiln at another operation, the Traylor dryer is 10 ft. in diameter by 120 ft. in length, and is driven through a **Falk speed reducer.**

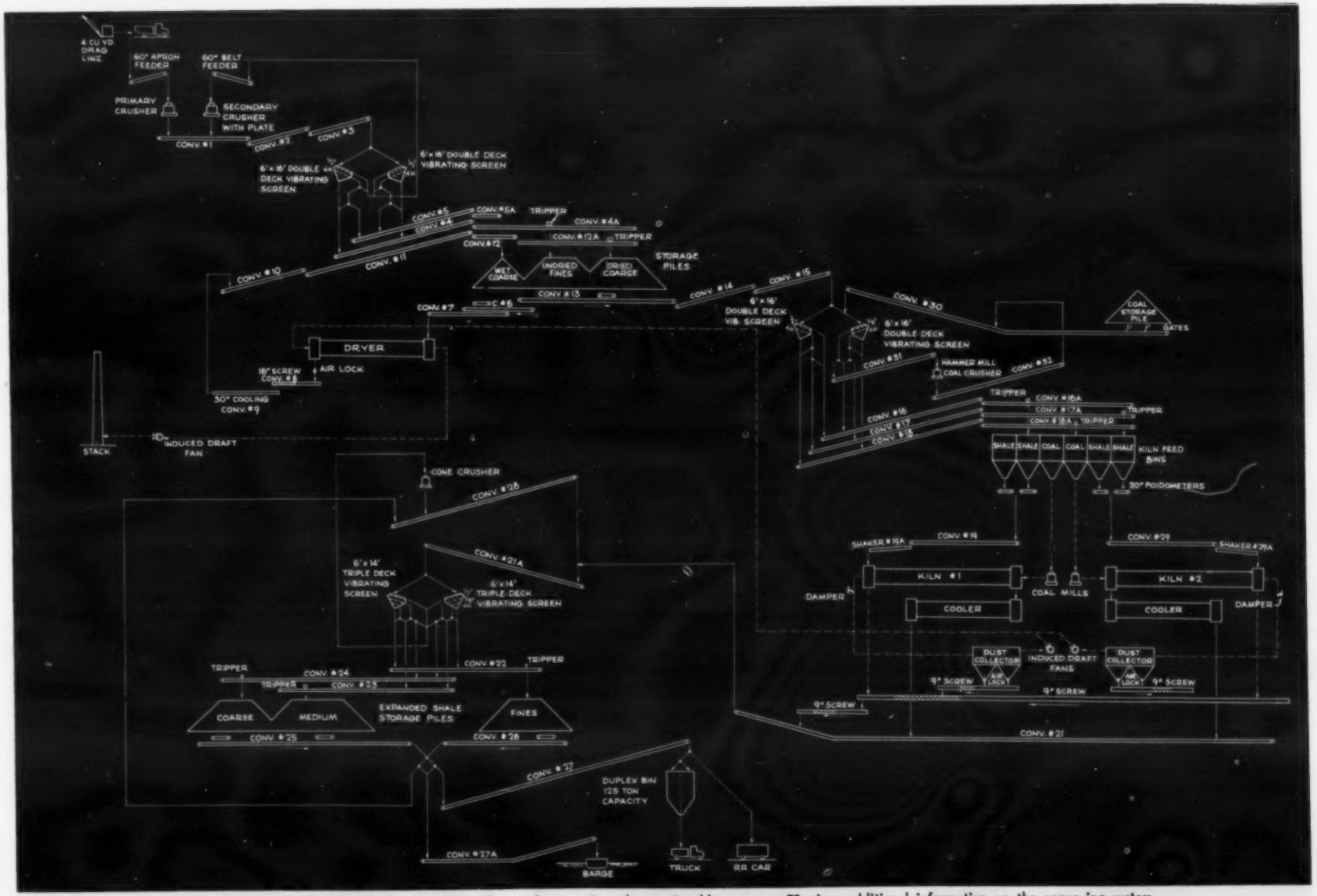
Moisture content of about 6 percent in the raw feed is reduced to about 1 percent in the dryer. **Hot air** for that purpose is provided from the two I.D. fans for the kilns at about 600 deg. F. (tempered kiln exhaust) and is introduced through the discharge end of the dryer. Another I.D. fan providing 115,000 c.f.m. of air at 3-in. S.P. and 250 deg. F. acts as a booster in exhausting from the dryer to a stack.

Dried shale is discharged through an airlock to a 16-in. screw conveyor and then transferred to a cooling conveyor (No. 9). The latter, fitted with Cambridge Wire Cloth Company wire-mesh belting, carries the hot shale on the top strand to one end, where it is dropped to the lower strand and carried back to discharge onto conveyor No. 10. From this point on, all conveyors (No. 10, 11, 12 and 12A) transporting the dried material back to stockpile in the raw shale storage building are equipped with heat-resistant Goodyear belting.

At the top of the storage building, No. 11 discharges to No. 12, which in turn delivers the dried shale to conveyor No. 12A, which has a Link-Belt tripper and drops the material on another stockpile.

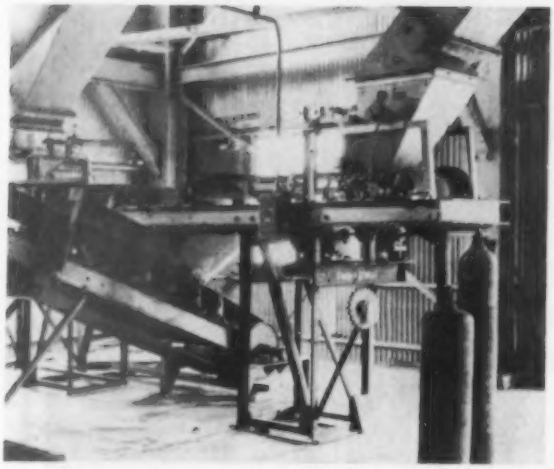
Kiln Feed Preparation As a final preparation step prior to transfer to the kiln feed bins, shale is drawn from the dried material stocks to reclaiming conveyor No. 13 for return to the crushing and screening house, where it is processed over a pair of dry shale screens. Following the reclaiming belt, conveyors No. 14 and 15 are in the foregoing material-handling system.

The 6- by 16-ft. Ripl-Flo dry shale screens are identical to the raw shale



A flow diagram showing the various material-handling and processing phases. A table on page 72 gives additional information on the conveying system.

A portion of the plant's extensive conveying system (over 6,000 ft.) is seen in this view from the primary crushing and screening building. The three units at the left convey material to the kiln feed bins in the firing building; those farthest right carry shale from the raw screens to the raw shale storage building; the top two (center) are in the primary crushing-screening circuit.



Two of the four Poidometers by which materials are transferred from bins to the feed belts supplying the kilns.

The top of the kiln firing building, showing the three tripper conveyors that discharge shale and coal into the appropriate kiln feed bins. Four of the latter are used for shale, and the other two for fuel.

units, with the exceptions that the upper decks have 3/8- by 2-in. openings, and the lower decks are not fitted with heated screencloth. Flow flexibility is again evident at this point: while top-deck retained fractions and bottom-deck throughs are chuted to separate conveyors for transport to the kiln feed bins, the lower-deck throughs, respectively, to diverted to either of these flow lines or be chuted to a third belt.

Inclined parallel conveyors No. 16, 17, and 18 carry the upper and lower deck retained fractions and lower-deck throughs, respectively, to the top of the kiln firing building, where they transfer their loads to No. 16A, 17A, and 18A. Each of the latter has a Link-Belt tripper that discharges the material to the appropriate underlying kiln feed bin. It is possible to put any shale fraction in any of the shale bins, and the kilns can be individually fed different size materials, or both can receive the same type.

The firing building houses six of the 400-ton capacity feed bins, the two outer pairs being used for shale and the inner two bins for storing coal and for kiln firing. This fuel, received at the plant site in rail or barge shipments, is rehandled by a clamshell crane to a 6,000-ton outside stockpile. Conveyor No. 30 transfers the coal from a pair of drop gates in a reclaiming tunnel below the stockpile to a coal screen in the crushing and screening building.

Here the fuel is discharged on an Allis-Chalmers 4- by 8-ft. single-deck screen with 1-in. openings. Oversize is chuted to a 24-in. McNally-Pittsburgh double-roll crusher driven by a 20-hp. motor. Crusher discharge is returned on conveyor No. 32 to the belt feeding the coal screen. Minus 1-in. throughs from this screen are chuted, when required, to conveyor No. 18 (the same unit that separately conveys dry shale fines) and transported to No. 18A at the top of the kiln firing building. The latter conveyor discharges the fuel to the two central bins.

Kiln Operation From these storage bins the coal is fed to a pair of Combustion Engineering, Inc., No. 452 Raymond Coal

(Continued on page 123)

FIRST

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Cement Mill Lubrication

By M. S. CLARK
Research and Technical Dept.
The Texas Company, Beacon, N. Y.

PART I

THE HISTORY of cement manufacture goes back hundreds of years B. C. When man first started to make buildings, walls, or fortresses out of stone, there was a need for a cementing material that would hold stones together.

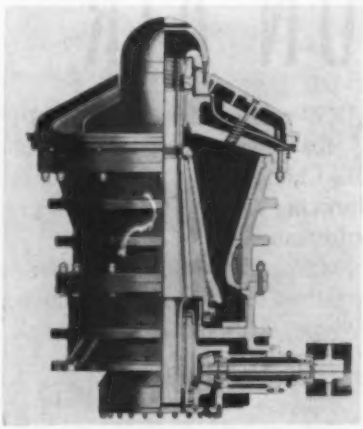
Various materials such as clay, lime, and gypsum, and blends of lime and volcanic ash were used with varying degrees of success. In fact, many of the ancient Roman buildings have stood up for centuries and are still standing.

The art of making cement that would harden under water was known to the ancient Romans but was lost for several centuries. However, the secret was re-discovered by an English engineer, John Smeaton, around 1758. He developed a cement made by burning lime and clay and used it for building a lighthouse where much of the construction was under water.

Joseph Aspdin, a stone mason in England, was granted a patent in 1824 for a "hydraulic" cement which would harden under water. He called it "portland" cement because it resembled the color of stone which was quarried in the Island of Portland near the British Coast. Although hydraulic cement had been made before, Aspdin introduced careful control of ingredients, burning and then regrinding the clinker.

During the early 1880's there was considerable demand in this country for hydraulic cement for construction of water ways, including the Erie Canal. In 1870 the first portland cement was manufactured in this country near Allentown, Pa., and cement manufacture is still an important industry in that area.

During the great expansion in American industry which has taken place in the last 80 years, there has been a gradual growth of the cement industry. Today we produce over 300 million bbl. per year, more than double the production of any other country.



Courtesy of Allis-Chalmers Manufacturing Co.

Figure 1—Superior gyratory crusher used for primary and secondary reduction of cement rock.

There are now over 175 portland cement mills in this country and Canada. Plants are located in 37 states, and most of the cement is used in areas not too far distant from the point of manufacture because of the high cost of long-distance shipment.

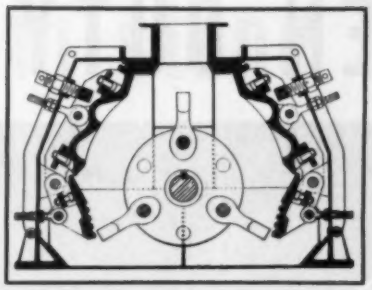
Concrete, which is a blend of cement, sand, aggregate, and water in definite proportions, plays a most important part in our present expanding economy. It is indispensable in the construction of some buildings and bridges and is also used in walks, airports, marine installations, streets, and highways.

COMPOSITION OF CEMENT

Raw ingredients used in cement manufacture consist chiefly of calcareous materials (containing calcium carbonate) such as limestone, chalk, or shells, combined with argillaceous materials (clay-like) such as shale and clay. Other materials such as sand and iron ore are often added when required to give the proper formulation.

These materials in definite proportions are crushed and ground to the fineness of flour so that approximately 90 percent will pass a 200-mesh screen.

The blend is then roasted to incandescence, just short of the fusion point, in a rotating continuous kiln for several hours at a temperature near 2700 deg. F. Certain chemical



Courtesy of Pennsylvania Crusher Div., Bath Iron Works Corp.

Figure 2—Sketch of Reversible Impactor used for secondary reduction of cement rock.

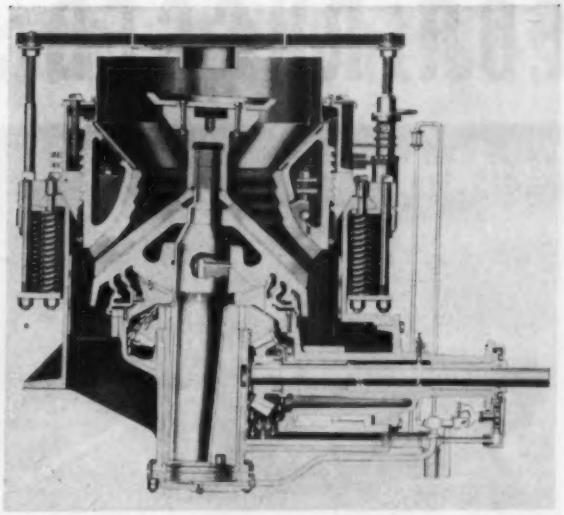


Figure 3 — Cutaway view of a Symons standard cone crusher.

reactions take place, and the resulting clinker is harder than any of the original ingredients. Water and carbon dioxide are removed during the process. The final cement which includes clinker plus a small amount of gypsum ($CaSO_4$) has the following approximate proportions (calculated as oxides):

	Avg. %
Calcium Oxide (CaO)	64.5
Silicon Dioxide (SiO_2)	23.0
Aluminum Oxide (Al_2O_3)	6.5
Iron Oxide (Fe_2O_3)	2.5
Magnesium Oxide (MgO)	2.0
Sulphur Trioxide (SO_3)	1.5

The calcium, aluminum, iron, and silicon in the clinker are believed to be combined as follows:

Di calcium silicate—$2CaO \cdot SiO_2$
Tri calcium silicate—$3\ CaO \cdot SiO_2$
Tri calcium aluminate—$3CaO \cdot Al_2O_3$
Tetra calcium aluminoferrite—$4\ CaO \cdot Al_2O_3 \cdot Fe_2O_3$

When water is applied, these ingredients react and affect the concrete in various ways:

Di calcium silicate has a slower reaction and gives later strength to the concrete.

Tri calcium silicate also has a fast reaction and provides early strength.

Tri calcium aluminate develops considerable heat and has a tendency to set quickly.

The chemical reaction in a concrete mixture continues slowly for years, with the hardness and strength increasing gradually.

TYPES OF CEMENT

The American Society for Testing Materials recognizes five types of portland cement, as follows:

Type I—For use in general concrete construction when the special properties specified for types II, III, IV, and V are not required.

Type II—For use in general concrete construction exposed to moderate sulphate action or where moderate heat of hydration is required (such as in moderately heavy construction).

Type III — For use when high early strength is required.

Type IV—For use when a low heat of hydration is required (such as in heavy dam projects).

Type V—For use when high sulphate resistance is required (such as in concrete exposed to alkali or sewage).

ADDITIVES IN CEMENT

The American Society For Testing Materials defines portland cement as follows.

"Portland cement is the product obtained by pulverizing clinker consisting essentially of hydraulic calcium silicates to which no additions have been made subsequent to calcination other than water and/or untreated calcium sulphate, except that additions not to exceed 1.0 percent of other materials may be interground with the clinker at the option of the manufacturer, provided such materials in the amounts indicated have been shown to be not harmful by tests carried out or reviewed by Committee C-1 on Cement."

The above definition recognizes the use of additives in cement.

It has been found by careful research work that the addition of small amounts of certain materials will provide remarkable improvements in certain characteristics. These additives greatly enhance the usefulness of concrete; the amounts must be very carefully regulated, however, so that other characteristics, such as compressive strength, flexural strength, and durability, will not be lowered. A few of the materials which are added to cement during manufacture are given below:

Air Entraining Agents Very small amounts (approximately 0.03 percent by weight) of various materials such as tallow, mineral oil, soluble oil, soap-like resins, or fatty materials are added to the clinker before grinding. In some cases they are added to the mix just prior to concrete manufacture.

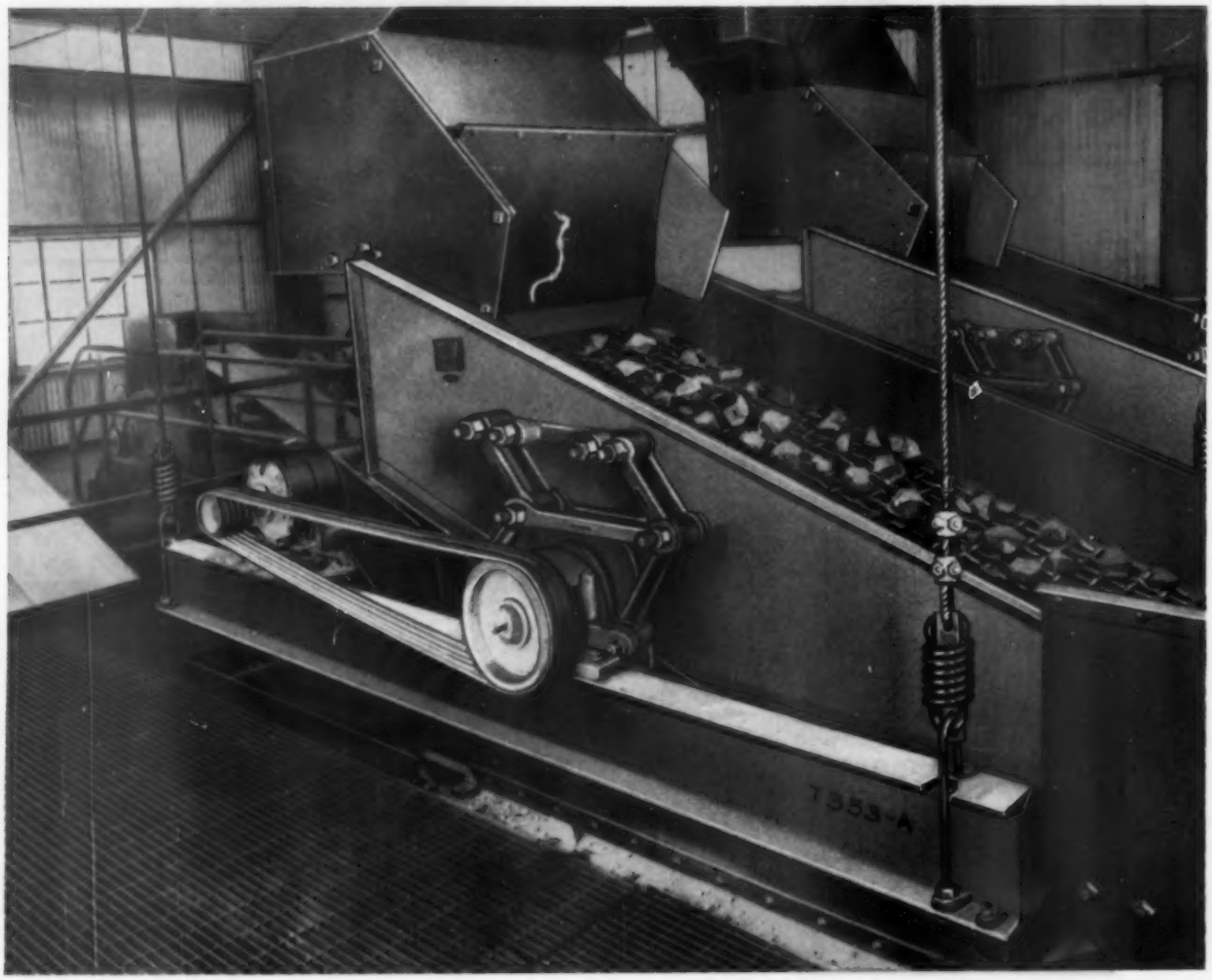
These materials produce millions of tiny bubbles throughout the concrete, and the air content is increased from 3 to 6 percent above the normal content. Air entrainment has several advantages:

1. It minimizes scaling and cracking of concrete surfaces during cycles of freezing and thawing and also cycles of wet and dry conditions.
2. The small air chambers relieve internal pressure by providing expansion voids for freezing water.
3. The concrete is highly resistant to the deteriorating action of calcium chloride, sodium chloride, or other chemicals used to thaw ice on pavements.

Air entrained concrete has become widely accepted in industrial construction, and most of the state and federal construction agencies specify it for concrete roads, bridges and other structures.

Grinding Aids Incorporation of a very small amount of grinding aid (0.03 to 0.05 percent be weight) into the clinker before grinding has the beneficial effect of keeping the steel balls in the ball and tube mills free from a

FOR RUGGED SCREEN DUTY



These two heavy-duty single deck suspension mounted vibrator screens are used in a stone plant for preliminary separation. Loading spouts feed to a stone box or shelf on which material can repose and form a cushion which reduces screen wear. Compact S-A screen design holds over-all dimensions to a minimum.

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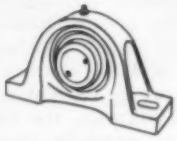

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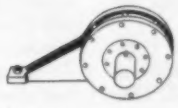
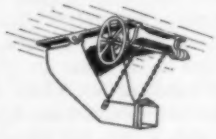


ENCLOSED TYPE HOLDBACKS



TUNNEL GATE

Enter 84 on card, page 101

in stone and gravel operations

EQUIPMENT FOR FEEDING, WASHING, SCALPING AND SEPARATING VARIOUS LUMPS INTO SPECIFIC SIZES

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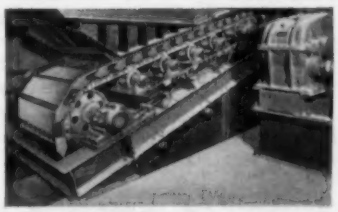
Vibration is produced by rotation of an eccentric shaft on which balance weights are mounted. The shaft is provided with completely sealed self-aligning ball and roller bearings. Because of the rotary screen motion, particles pass over its surface in every conceivable position before they are discharged as oversize, guaranteeing highest grading accuracy. Screen panels stretched over a longitudinal arc prevent accumulation of material along each side. These panels can be quickly and easily reversed for maximum life. Pantograph stabilizers hold the screen body at any inclination from 12° to 24° with a simple adjustment. A wear reducing loading tray cushions screens against material impact.

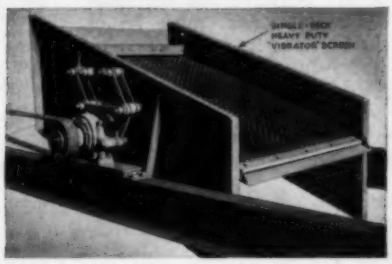
Both floor and suspension frames are available and single, double or triple screen decks may be mounted on either type frame. Floor mounts provided with rubber cushioned vibration dampeners.

For the type and size screen that best suits your needs, consult the S-A engineer in your area, or send for screen bulletin No. 757

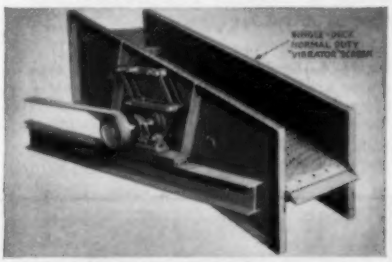


The mighty AMSCO Feeder, used in many rock handling operations, is an S-A product. With pans and chain made of manganese steel, these feeders will withstand tremendous impact from falling rock.

S-A Live Roll Grizzlies are especially valuable for preliminary separation of sizes. Material travels over a series of rotating rollers, eliminating fines and greatly increasing the efficiency of classification.



Style No. 400 — Heavy-duty vibrating screen will handle heaviest duty scalping and screening. It can be furnished with a sub-frame for direct floor mounting or suspended mounting. Screen motion is not affected by screen load.



Style No. 300 — Normal-duty vibrating screen will handle medium screening loads. Rubber seal strips between panel sides and screen body furnished with panels of less than ½" openings, preventing material leakage and guiding it over screen openings.

-ADAMSON

EQUIPMENT

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coating of cement. In some cases this has resulted in an improvement in grinding efficiency. One such material is reported to consist of a blend of tri ethanol-amine, sodium soaps of lignin and rosin, and a small amount of fatty acid.

Water-proofing Additives Small amounts of calcium stearate powder are sometimes added to clinker before grinding to provide water-proofing to the bagged cement in warehouses. This prevents undue hardening from absorption of atmospheric moisture during storage.

Quick-Setting Additive Quick-setting additive consisting of a small amount of calcium chloride is often added to concrete when it is mixed in winter. The chief purpose is to prevent freezing of concrete. This type of additive differs from the above in that it is added to *concrete mix* and not to cement during manufacture.

MANUFACTURING PROCESSES

Wet Process Cement is manufactured by either the wet or the dry process. In the wet process, water is mixed with the pulverized ingredients, and a thick slurry is formed. This method has several advantages:

1. Presence of dust in the mill is greatly reduced.

2. The wet method is preferred where there would be an advantage in blending raw materials.

Dry Process In the dry process, the cement ingredients are conveyed from one location to another by means of cement pumps and conveyors. Other than slurry handling and flotation, the dry method employs the same type of equipment as the wet method.

In the following pages, the wet manufacturing procedure is outlined in chronological order from raw material to the finished product. Information is also provided on lubrication of the major pieces of equipment.

DESCRIPTION OF WET PROCESS

Cement Mill Machinery Portland cement manufacture requires the processing of immense quantities of heavy rock and other ingredients, so that there will be a continuous flow of materials through the plant to produce the finished product.

Most of the machinery is of very heavy construction, and large amounts of fuel, electricity, and lubricants are required for its operation. The lubricants must be of high quality and capable of handling heavy-duty loads and of providing adequate lubrication often under very adverse conditions. Precautions must be taken to protect lubricants from dust which is always present. Water and high heat conditions also present hazards to lubrication.

Quarry In the average cement plant the quarry operations may be situated from one to several miles away. In the quarry several types of equipment are used:

Drilling Machines—Vertical holes usually 4 in. to 6 in. in diameter are drilled in the rock and are charged with explosives for blasting off the face of the quarry. The older type drills employ water to remove the drilling dust but with the newer rotary drills, dust is blown out with air. Holes are often 100 to 150 ft. deep.

Drilling machines may be powered by electric motors, which are lubricated by ball- and roller-bearing grease. Other machines may be operated by gasoline engines, which are lubricated with a good motor oil, usually SAE 30 grade.

Electric and Diesel Shovels—Blasted rock is loaded by shovel into small rail cars or trucks for transportation to the crushers. The electric shovels are powered by electric motors which are lubricated with ball- and roller-bearing grease. Heavy residual-type lubricants are usually satisfactory for the gear assemblies.

Diesel shovels are powered by diesel engines, which are normally lubricated with heavy-duty motor oils.

Figure 4—Double Whizzer mechanical separator used for separating fine and coarse cement particles.

Courtesy of Combustion Engineering, Inc., Raymond Div.

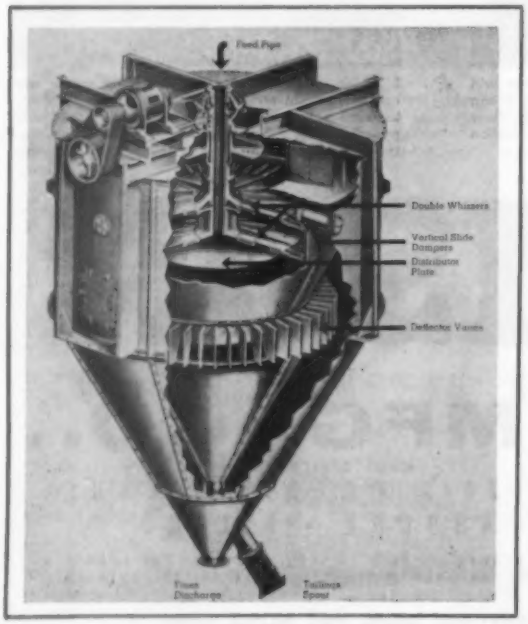
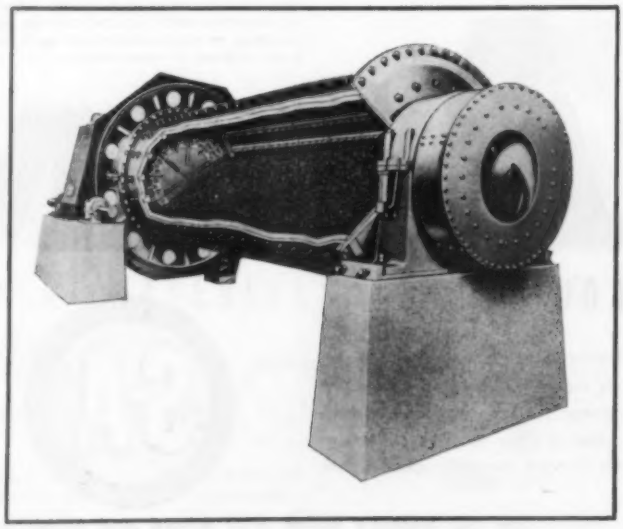
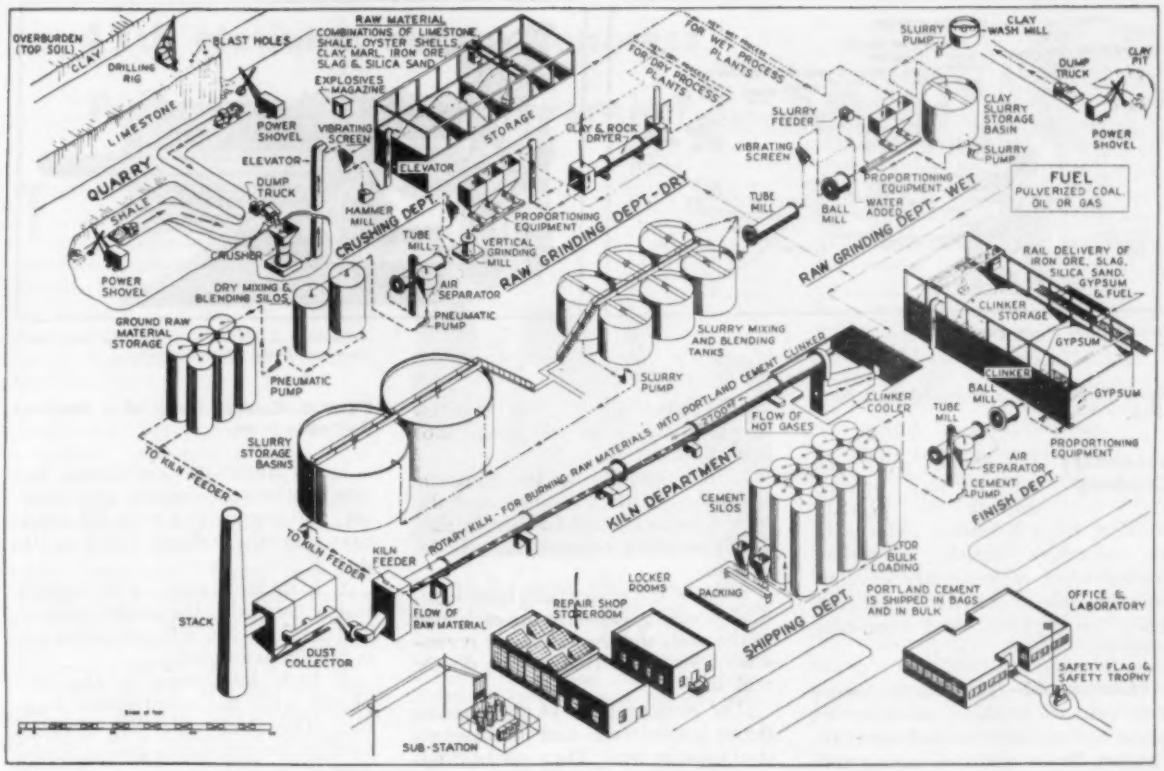


Figure 5—Ballpeb grinding mill used for secondary grinding to produce finished cement.

Courtesy of Allis-Chalmers Manufacturing Co.





Courtesy of Portland Cement Association.

Figure 6—Flow chart of the manufacture of portland cement.

Pumps—Surface and seepage water collects in pockets on the quarry floor, and pumps are required for removal. Centrifugal pumps with ring oil type bearings are lubricated with low-viscosity mineral oil. Grease-type bearings usually require No. 2 NLGI grade ball- and roller-bearing grease.

Railway Cars or Diesel Trucks—Diesel-operated narrow-gauge trains, or diesel trucks are used to transport rock to the crushers.

Diesel engines are lubricated with heavy-duty motor oil. Journal bearings of railway cars are usually waste-packed and lubricated with car oil.

Primary Crushing Rock is received at the crusher in varying sizes, some pieces as long as 3 or 4 ft. This rock must eventually be reduced to the size of fine powder. The primary crushing is usually performed by roll, jaw, or gyratory crushers which reduce the size to 4 in. or less. Pressures in these mechanisms are tremendous, and considerable heat is developed.

Roll Crusher—In this type of machine, rock is crushed by the action of knobs on a large rotating roll beating against a stationary anvil. The crushed rock drops down into a hopper feeding onto a conveyor which carries the rock to the second crushing operation. The sleeve-type bearings which support the large roll are usually lubricated with grease of No. 2 or No. 3 NLGI consistency applied through a pressure system.

Jaw Crusher—The crushing in this type of machine is performed by a heavy steel casting or pitman, which oscillates and provides the crushing effect. The crushed rock falls through the bottom of the crusher onto a conveyor which carries it to a storage bin or to another crushing machine. The bearing of the pitman is usually water-cooled to remove heat and is lubricated with No. 1 or No. 2 NLGI grade grease.

Gyratory Crusher—In this machine the crusher head rotates with an eccentric rolling motion. The rock is crushed against the outside shell and falls through the bottom to conveyors for further handling.

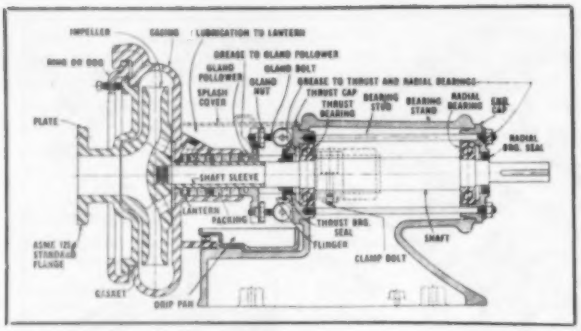
The crusher is driven by bevel gear and pinion through a pinion shaft. Power can be furnished by engine or electric motor through a V-belt drive.

The bearings as well as gears in crushers are subjected to very heavy loads, extremes of temperature, and a great deal of dust and grit. Lubrication is usually handled through a circulating system consisting of a pump and a sump tank (50- to 250-gal. capacity) which is equipped with a filter.

Oil is delivered by gear pump from the tank through filters and then through the cooler into the crusher. Hot used oil then returns to the tank. Temperature of the oil returning from the crusher is usually held between 100 deg. F. and 130 deg. F. A mild EP lubricant with viscosity of 300-500 seconds at 100 deg. F. is usually specified for this use.

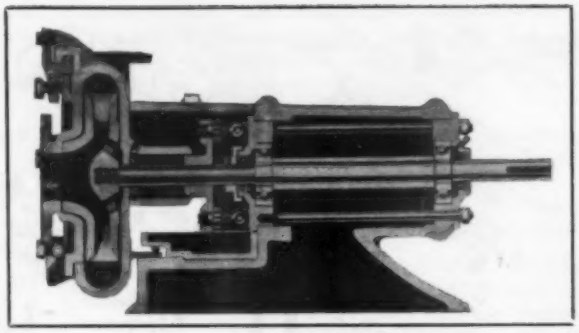
Scalping or Vibrating Screens—Rock from the primary crushers is processed through scalping or vibrating screens (approximately 1-in. mesh). The finer material is conveyed to the rock storage while the material above 1 in. size goes on to the secondary crushing operation.

Antifriction bearings on these screens are usually lubricated with No. 2 NLGI grade ball- and roller-bearing grease applied by pressure gun.



Courtesy of Nagle Pumps, Inc.

Figure 7—Sketch of a horizontal shaft slurry pump.



Courtesy of American Manganese Steel Div., American Brake Shoe Company.

Figure 8—Cutaway sketch of a horizontal shaft slurry pump.

Secondary Crushing The coarser sized rock which has passed through the primary crushing stage is further reduced in the secondary crushing operation. Several types of secondary crushers are available, including hammer mills, impactors, and cone-type crushers.

Hammermill—The larger pieces from primary crushing are delivered to the hammermill for additional reduction. In the first zone of this mill, rotating hammers beat the rock feed against large anvils. The material ricochets and is struck again until it is shattered.

In the second zone the hammers operate at closer clearance, and the rock is reduced still further in size, finally escaping between bars at the bottom.

Some of the newer mills have identical crushing capacity on each side of the mill, and the rotors are reversible. This is reported to give double mill life.

The working parts of crushers undergo terrific wear, and the toughest steel must be used. The rotor bearings on these mills are usually antifriction roller type and are carefully housed to exclude abrasives.

Due to the comparatively high speed of these machines, oil is used to lubricate the rotor roller bearings. Oils with viscosity at 100 deg. F. (SU) of 150-500 seconds are satisfactory in various units. Static oil lubrication is used on the smaller machines, and a circulating system is used on the larger units.

Reversible Impactor—Impactors have construction somewhat similar to that of hammermills. They are equipped, however, with extra-rugged breaker blocks, and in addition to being ground by the hammers, rock is also shattered by being impacted against the blocks.

Lubrication of the rotor bearings is similar to that on hammermills.

Hydraulic Cone Crusher—In this type of crusher the mainshaft, which includes the crushing cone, can be raised or lowered hydraulically by means of a hydraulic jack. Oil pumped into or out of the jack raises or lowers the entire assembly and changes the crusher setting. This controls the size of the crushed rock and also compensates for wear on the mantle and the concave crushing block.

In order to supply adequate lubrication to all working parts, three lubrication systems are employed:

1. An automatic circulating system lubricates eccentric, step bearing, and gear with a mild EP lubricant (viscosity 300 secs. (SU) at 100 deg. F.).
2. Bath lubrication with a garter seal is used with the spider bearing, and an SAE 250 EP gear lubricant is usually satisfactory.
3. Bath lubrication is also employed with the countershaft bearing. The same mild EP lubricant used in the circulating system is also used here.

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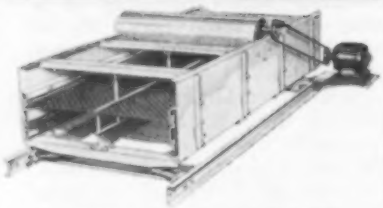

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American Welding Society To Move Show to St. Louis

The American Welding Society will move the site of its annual Welding Show to St. Louis next year, as part of its continuing program to hold the exposition in a different area each year.

The sixth in the series of shows will be held at Kiel Auditorium, St. Louis, April 15 to 17, inclusive. During the same week, April 14-18, inclusive, the society will hold its annual technical meeting at the Hotel Statler. An informal Welding Conference, on a less technical basis, also will be conducted. Plant tours in the St. Louis area will round out the program.

Additional information on program and hotel details may be obtained by writing A. W. S. Welding Show, c/o Robert T. Kenworthy, 12 East 41 Street, New York 17, N. Y.

Verde Gypsum, a new Arizona corporation, recently started shipping gypsum, thereby replacing a supply that formerly came from California. The firm recovers the mineral from a $250,000 development 4½ miles east of Camp Verde. The deposit was staked out originally in 1924, but trucking had not been economically feasible until the construction of the Black Canyon highway.

45th National Safety Congress Pinpoints Accident Prevention

THE how and why of industrial accident occurrence, and remedial procedures to prevent recurrence were subjects of intensive discussion by industry men attending the Cement, Quarry, and Mineral Aggregates Section of the National Safety Congress held in Chicago, October 21-25.

These points were strongly emphasized—that *people,* not hazardous conditions, represent a more accurate definition of the cause of accidents; that the elimination of industrial injuries is primarily a matter of correcting unsafe acts; and that while important lessons may be learned from fatalities, these lessons are beneficial only if applied to every unsafe procedure, whether of major or minor consequence.

Several factors in safety procedures and accident prevention were discussed in a number of outstanding papers. Among these were: *A Job Interview Program,* by Robert C. Wagner, Universal Atlas Cement Co.; *Fatalities in the Cement, Quarry, and Mineral Aggregates Industries,* by Arvid Tienson, safety director, Lynons quarry, Material Service Co.; *Safer Blasting Through Engineering,* by Raymond H. Green, safety engineer, New Haven Trap Rock Co.; *Safety Discipline,* by Carl Heinicke, Electromotive Corp.; *Ideal's Personal Protective Program,* by Frank N. Price, Ideal Cement Co.; and *Conveyor Safety,* by C. M. Pollard, National Gypsum Co.

The initial order of business to be undertaken under the direction of Howard Riefenstahl, safety director, Alpha Portland Cement Co., was the election of section officers for the coming year. Newly-elected officers are: general chairman—Seymour B. Fleming, safety director, New York Trap Rock Corporation (a member of the section's executive committee since 1947); first vice-chairman—Paul Worseck, assistant manager safety and welfare, Lehigh Portland Cement Co., a past vice-chairman; second vice-chairman—William A. Kipp, safety director, Universal Atlas Cement Co., former program chairman; and secretary—Raymond H. Green, safety engineer, New Haven Trap Rock Co.

During the second meeting of the session for this congress, presided over by Mr. Fleming, a certificate of appreciation was presented to Mr. Riefenstahl for his outstanding leadership of the section in the two years 1955-57.

Seymour B. Fleming, left, safety director of New York Trap Rock Corporation, succeeds Howard Riefenstahl, right, Alpha Portland Cement Co., as general chairman of the Cement, Quarry, and Mineral Aggregate section of the National Safety Council. Mr. Riefenstahl retires from a two-year term. Mr. Fleming has been a member of the executive committee since 1947.

In the discussion of a job interview program, it was noted that statistics show most accidents are traceable to unsafe acts on the part of employees. Through individual job interviews, the accent can be placed on acts in lieu of conditions. This practice will help to determine whether employees are working safely, it will identify weaknesses in procedure, it will alert individuals to possible unrecognized hazards in their areas, and it will alert them to the use of protective equipment.

With respect to blasting, it was pointed out that the handling and use of explosives is a constant and elementary problem in quarry safety. The application of sound engineering practices has not only made this a safer activity, but it has also been a cost-saving step. The importance of good drilling lies in getting a hole to the proper depth, precisely where engineering study shows it should be; and the individual consideration of each hole is one of the most important factors in setting up a safe, controlled primary blast, it was emphasized. Condition of blasting supplies was stressed also as a primary safety factor. Accuracy and attention to details—large and small—will result in safer, more efficient use of explosives.

Fatalities in these industries have led management to the positive insistence that supervisors instruct employees properly in the potential hazards. The presentation of a number of case histories revealed that more than 80 percent of the fatalities in the cement, quarry, and mineral aggregates industries are caused by the Four Horsemen as publicized by the P.C.A.—High places, Electricity, Moving Machinery, and Haulage.

Among the basic suggestions directed toward elimination of potential deaths were these: the establishment and enforcement of primary safety rules which must receive full support from top management, and would be a condition of employment; the instruction of new employees by foremen and supervisors on the possible hazards and countering safety procedures—before the employee starts work—plus mandatory instruction on personal protective equipment and mandatory use of these devices.

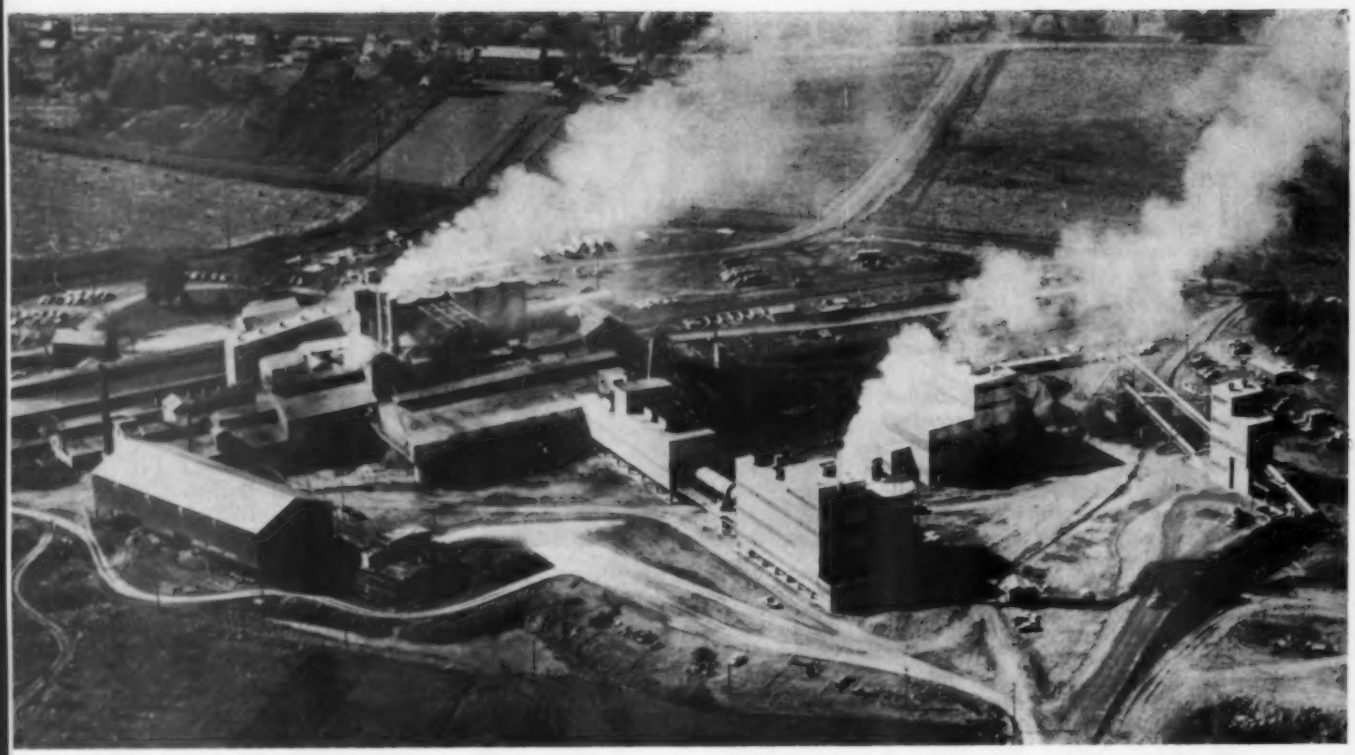
It was emphasized, as it must be constantly, that only a 100 percent program adhered to by 100 percent of the personnel can be effective. Experience has shown time and again that a casual attitude on the part of just one man can quickly equal one more fatality.

U. S. Durox Corporation Completes Plant in Colorado

At Englewood, near Denver, Colo., the Durox Corporation of Colorado has completed a plant for the production of a Swedish lightweight concrete, which utilizes portland cement, gypsum, lime, aluminum powder, and a pozzolan as raw materials. Daily quicklime requirements are 200 cu. yd.; and the block output is between 25 and 50 tons per day.

Swedish-American Industries, the Durox licensor, has granted other licenses for plants in Minneapolis, San Francisco, Dallas, and Miami.

Cementos Rezola of Spain has completed an improvement program at its plant near San Sebastian on the extreme east end of the northern coastline. The expansion included the addition of grinding mills, rotary kilns, electrostatic filters for dust recovery, and storage space for 50,000 tons of raw materials. The company is currently building a new plant for the production of white portland cement.



Diamond Portland

completes extensive expansion program

By WALTER E. TRAUFFER

ANOTHER ON THE SPOT REPORT

THE Diamond Portland Cement Company, Middle Branch, Ohio, in October, 1957, completed an expansion program which increased the capacity of the plant by 70 percent and greatly improved it in many ways. This program, carried out over a period of several years, affected nearly every department. It was centered, however, on the new 3,500-bbl.-per-day Allis-Chalmers ACL double-pass traveling grate and kiln system, which is notable for its low fuel consumption and low dust loss. During this period also a new secondary crushing and screening department and a complete new raw mill department were built. This grate-rotary kiln was designed for a fuel rate of 630,000 B.t.u. per bbl. which has already been achieved for long periods after only a few months' operation. The dust loss is below the guaranteed maximum of 1 percent.

Diamond Portland is one of the pioneers of the cement industry in this country, having been incorporated in 1892. This plant began operating that year with a single mixed-feed vertical kiln and a capacity of 100 bbl. daily. There were several expansions, and in 1900 rotary kilns replaced the shaft kilns. Further expansions and improvements were made over the years, and by 1955 the capacity of the plant, with three 10- by 150-ft. rotary kilns, reached 1,450,000 bbl. annually. The new ACL kiln installation brought the total capacity of this plant up to 2,500,000 bbl. of clinker annually.

In anticipation of its expansion program, a new quarry—No. 3—was opened in 1955, and the No. 2 quarry was placed on the stand-by basis. Limestone from quarry No. 2 is available either to supplement production from No. 3 or to operate the plant at capacity in the event of a breakdown in No. 3 The new quarry is located

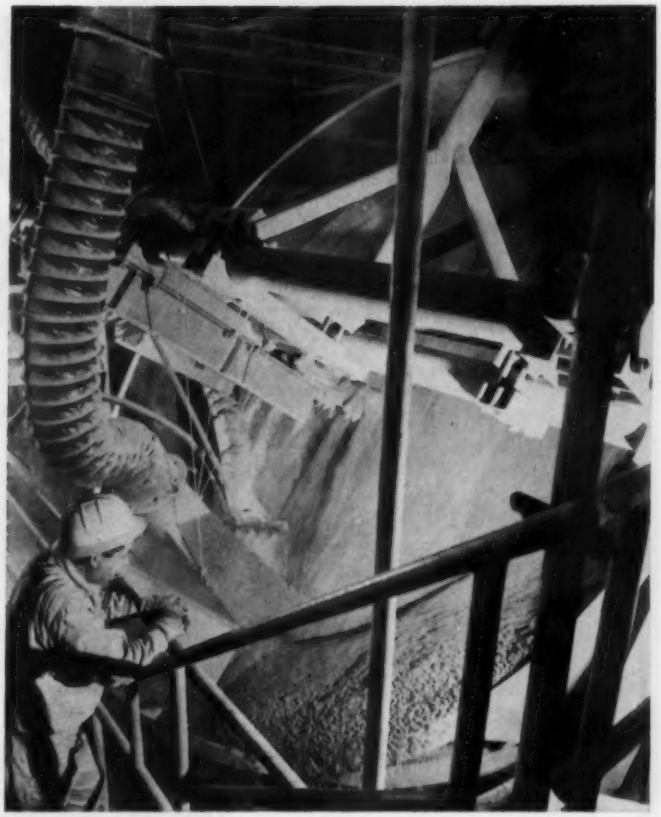
← An air view of the Diamond Portland Cement plant at Middle Branch Ohio. From right to left are the new secondary crushing and screening department, the raw mill building, and the grate-rotary kiln, with raw material homogenizing silos.

ACL double-pass traveling grate and kiln system featured...

6 miles from the plant. Overburden averages 65 ft. in depth and is removed by a No. 726 Page diesel walking dragline purchased in 1954. This unit, which has an 8½-cu. yd. Page dragline bucket and a 180-ft. boom, overcasts back into the quarry. The rock averages only 7 ft. in depth and is loaded into trucks by a 2½-cu. yd. 54B Bucyrus-Erie diesel shovel. The stone is trucked up a ramp to the 30- by 42-in. Pioneer primary jaw crusher, which reduces to 5-in. minus. A 5- by 18-ft. Universal pan feeder precedes a 42- by 82-in. Jeffrey impactor which is in closed circuit with two 5- by 11½-ft. Allis-Chalmers Ripl-Flo 2-deck enclosed screens. The minus ½-in. finished raw material is discharged to a stockpile which will later be enclosed. A crane is being used temporarily to rehandle the rock to the raw-mill feed bins.

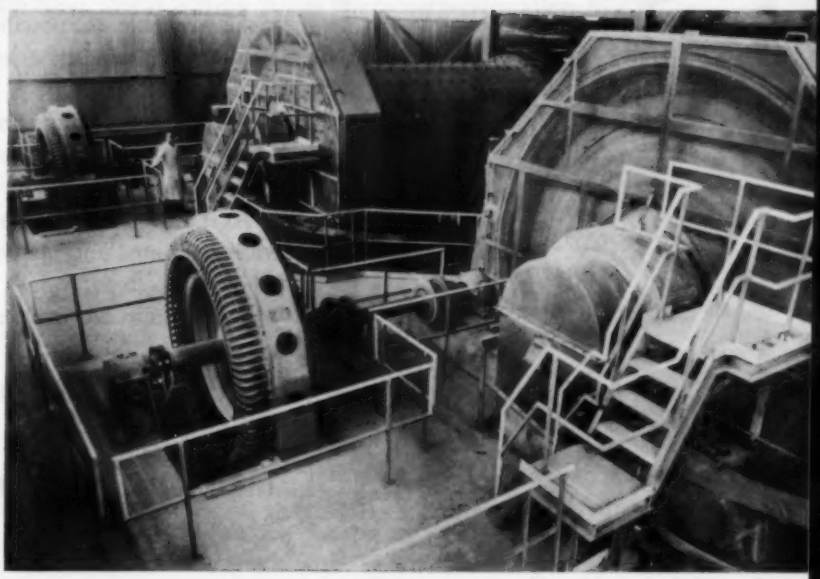
Shale is quarried 3 miles from the plant and is hauled there by truck. It is crushed and dried and is also fed by crane to the raw-mill feed bins.

Raw Mill In the new raw-mill building limestone is stored in two 300-ton bins and shale in two 150-ton bins. These are the first items in the two identical grinding circuits. In each circuit Hardinge c/w feeders under the bins proportion stone and shale to a drag-chain conveyor. A Continental super-capacity bucket elevator feeds to a 16-ft. Sturtevant separator which is equipped for drying. This is connected to a 10-ft. 6-in. by 17-ft. Allis-Chalmers ball mill which is driven at 18.3 r.p.m. by a 1,000-hp. Allis-Chalmers synchronous motor. A Farval lubricator is used on each mill



One of the two 15-ft. dia. pelletizers which prepare the raw material for feed to the grate section of the kiln. Note the water spray at the bottom of the pan, feed tube, and dust hood.

Below: The two 10-ft. 6-in. by 17-ft. raw-grinding ball mills, with their 1,000-hp. synchronous motors. Note the unusual safety precautions taken —rails, screens, etc.



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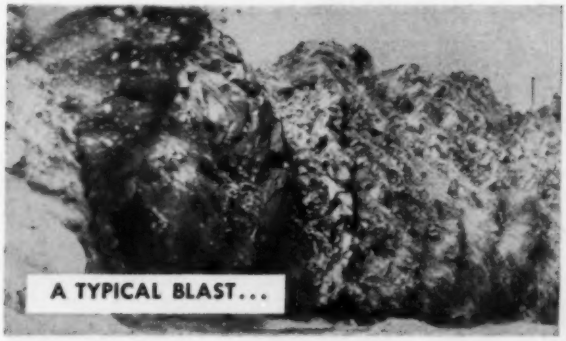

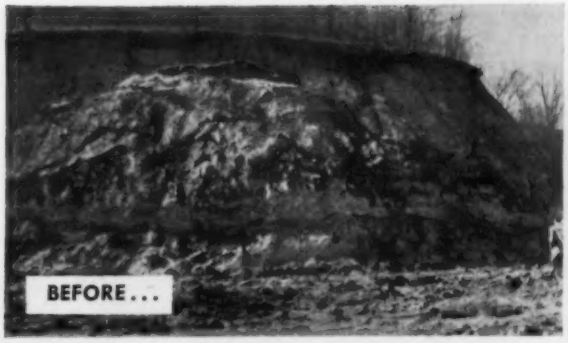

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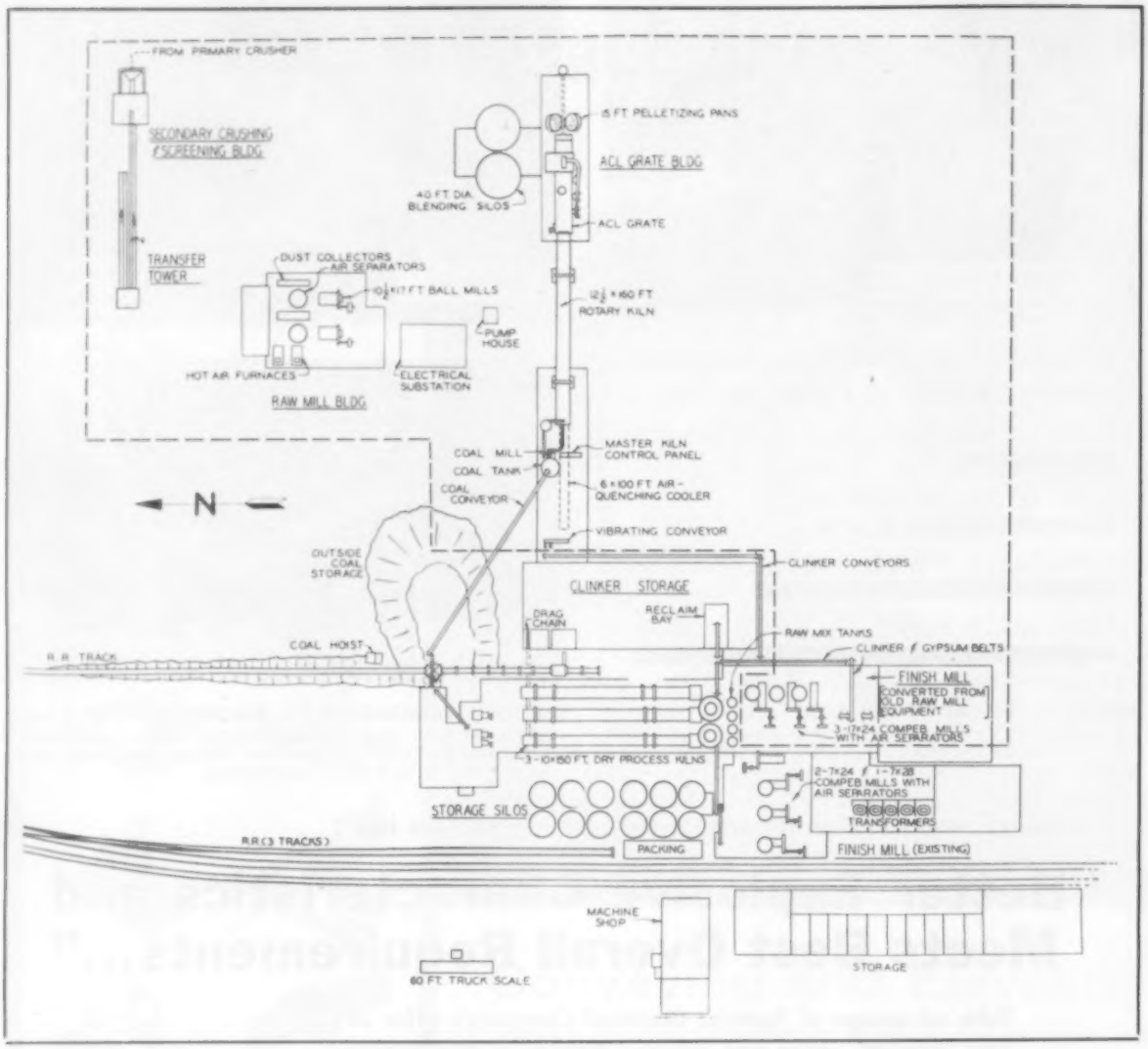

Layout of the Middle Branch plant. At the top are the new departments—secondary crushing and screening building, raw mill building, and grate-rotary kiln system.

drive. Each mill is loaded with 60 tons of carbon manganese steel grinding balls as follows:

7½ tons	1½ in.
22½ tons	2 in.
22½ tons	2½ in.
7½ tons	3 in.

The separator tailings form the mill feed, and the mill discharge is carried by bucket elevator back to the separator. The separator fines form the finished product—ground to a fineness of 90 per cent through 200-mesh.

These raw-grinding systems get drying heat from a pair of Bigelow-Liptak Corporation hot air furnaces, each rated at 14,000,000 B.t.u.-per-hr. capacity, and fired with slack coal by a Hoffman (Combustion Engineering Co.) Firite automatic stoker. In this system the controlling temperature is that of the raw material going into the mill, which is held at 150 deg. F. This usually requires about 600 deg. at the furnace bonnet, and the fire in the furnace is controlled by the residual heat from the separator, which is usually about 150 deg. but may go up to 180 or 185 deg., depending on the moisture content of the raw material fed to the separator.

The air swept from the separator goes through a duct and a Norblo precleaner or settling chamber to an 18,500-c.f.m., 30-ft. Norblo bag-type dust collector. This exhausts to atmosphere. The dust from the precleaner and collector is carried by a 10-in. Fuller-Huron Airslide, along with the mill product, to a 10-in. Fuller-Kinyon pump. The entire system is insulated—including the heat ducts, separator, precleaner, dust collector, and elevator. The entire mill room is controlled from a console panel designed by the Macdonald Engineering Co.

Homogenizing The 10-in. Fuller-Kinyon pump feeds the fine raw material to a pair of Fuller homogenizing or blending tanks. These are 40 ft. in diameter with straight sides 37 ft. high and sloping bottoms pitched 1¼ to 12. The bottom of each tank is paved with porous plates through which air is blown from pipes set in the concrete. These plates are divided into four 90-degree sectors. Each of the four sections is supplied periodically through a solenoid-operated air valve. Eight porous plates at the low side receive full air at all times to facilitate withdrawal.

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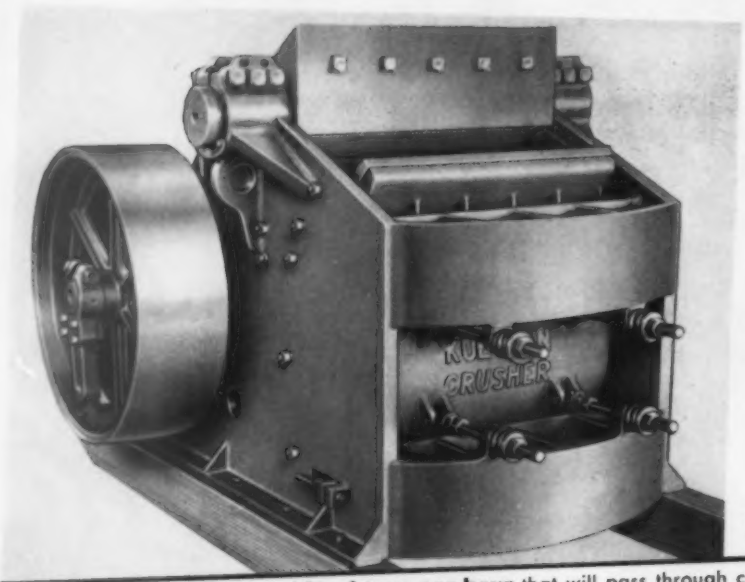

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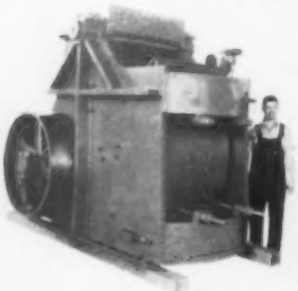
gives greater capacity at lower operating cost

Here is a table of tons per hour that will pass through crusher with jaws set at dimensions shown when measured in the closed position.

Kue-Ken crusher size	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	5"	6"	Horsepower range
24" x 12"	22	26	32	36	43	50	56					15 to 30
30" x 12"	32	35	38	42	55	70	76	85	110			20 to 30
36" x 10"	38	47	57	67	80	91	105					25 to 40
36" x 20"					70	82	90	115	135	160		30 to 50
42" x 25"					90	120	150	165	180	215	250	40 to 60

Table is based on crushing average hard dry quartz or similar rock weighing at least 100 lbs. per cubic foot when crushed. 32 sizes available from 12" x 5" to 48" x 42".

Kue-Ken crushes more tons per hour for its size than any other crusher. A built-in lubrication system allows Kue-Ken to operate at more crushing strokes per minute for greater capacity and more uniform product. Sealed against dirt and grit, the mechanism operates smoothly avoiding costly down-time and repairs unavoidable with crushers without a lubrication system. With minimum friction, Kue-Ken requires substantially less horsepower to operate. An automatic flywheel release prevents damage from tramp iron. Operating on an exclusive "crushing without rubbing" action, Kue-Ken jaw plates last at least 5 times longer. Kue-Ken is the most profitable crusher to use for any crushing requirement. See in the adjoining chart how a smaller, less costly Kue-Ken can provide the capacity you require.



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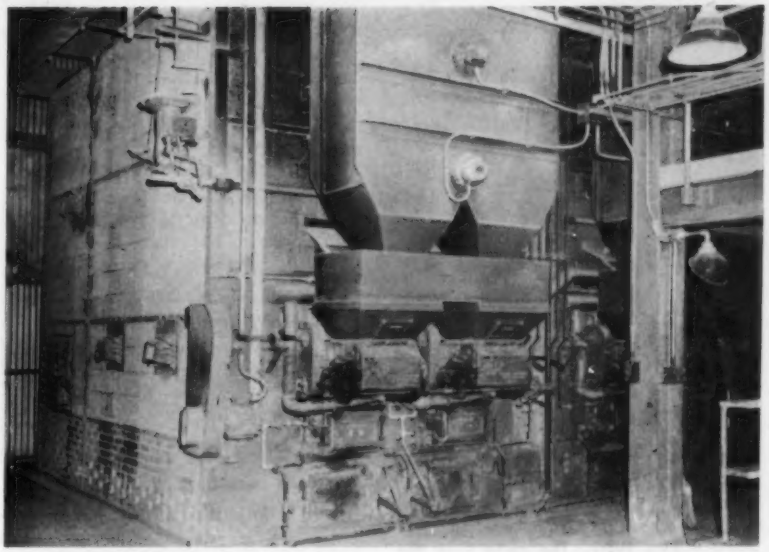
trolled by a timer. Every 15 minutes one 90-degree section is shut off and the next one ahead goes on. A complete circuit is made every 60 minutes. While any 90-degree sector is blowing, the other three are receiving enough air through orifices to keep the material fluid.

There are two alternative methods of using these silos. One is to fill them alternately, drawing from one while feeding to the other. The other method, used at this plant, is to feed into and pull out of one tank continuously, keeping the other silo full of OK raw material for the purpose of changing the mix when necessary. Actually, it is being used only as added supply in case of raw mill shutdown. The stand-by silo is supplied with enough air to keep the material fluid. The active silo is filled, homogenized, and drawn from continuously; but it must be kept nearly full at all times for good mixing. High- and low-level indicators actuate lights to keep the operator informed. Withdrawal is through a rotary shutoff valve feeding *via* a 14-in. choked screw to a 10-in. Fuller-Kinyon pump. This pump feeds to both the old and new kiln departments. Each of the tanks holds about 1,100 tons of raw material.

Pelletizing The stream of kiln feed material from the homogenizing tanks for the new kiln goes to a pair of 450-ton-capacity raw-mix hoppers, which are the first step in a pair of identical kiln feed preparation systems, one a stand-by. These hoppers have high- and low-level Bin-Dicators which operate lights at the homogenizing tanks. From a hopper a Fuller rotary valve and a Fuller motor-operated rotary feeder discharge at the rate of 65 t.p.h. to a common cross screw conveyor. This unit discharges to one of two bucket elevators, which feeds to one of two main screws. The latter, in turn, feeds to the two pelletizer feed screws, any excess material returning by gravity to the hopper in use. Each pan is now being fed 22½ t.p.h., so that the overflow is 20 t.p.h.

The two pelletizing pans or nodulizers—made by the McDowell Company— are 15 ft. in diameter and 36 in. deep. Each is driven at 8 to 10 r.p.m. by a 40-hp. d.-c. motor. Each has an adjustable lip which can be extended further, a stationary scraper for the sides, and a movable one for the back of the pan. Water is sprayed at the bottom of each pan. The variables in the pan are the rate of material and water feed, the pan speed, and the slope of the pan; and the operator can adjust these to get the desired results. In this operation the material balls easily and holds up well, and little difficulty is experienced in producing the desired ⅜- to ¾-in. pellets. Larger pellets can be made by speeding up the pans and/or reducing their angle, and *vice versa*.

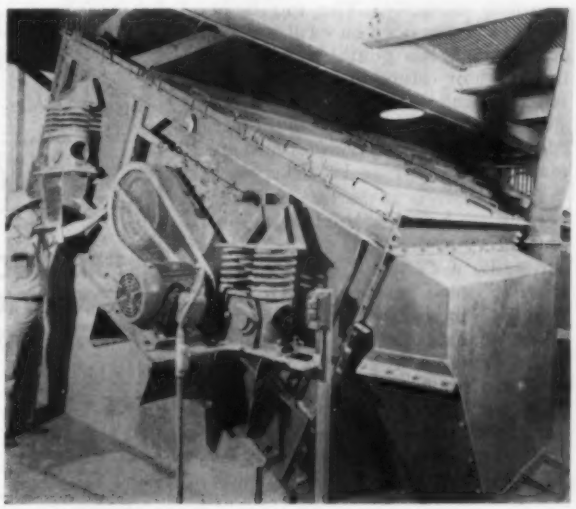


The two 14,000,000-B.t.u. per hr. stoker-fired furnaces which supply hot air to the separators of the two grinding circuits for drying the raw materials.

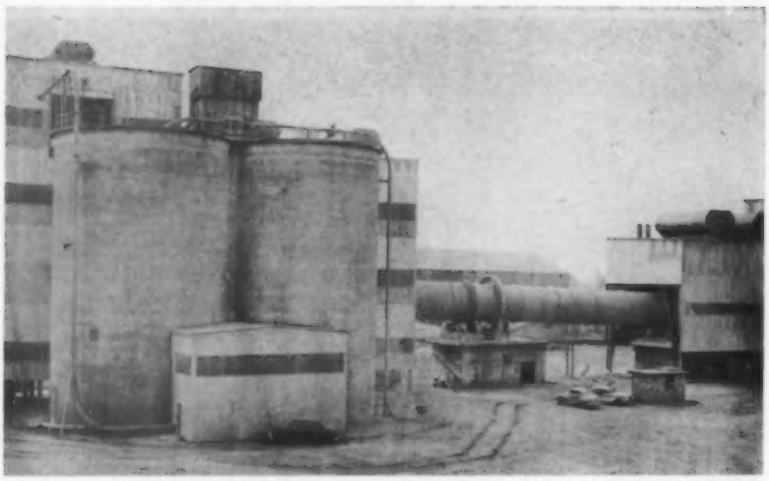
ACL System The pellets are discharged from the two pans onto a common grate-feed belt conveyor. This is 24 in. wide by 17-ft. centers. It is pivoted at the feed end and swung at the discharge end to distribute the pellets evenly over the 12½-ft. wide grate feed hopper. This shallow hopper is kept about ¾ full, about a 1-minute supply for the ACL kiln. Careful control of the feed rate is necessary as no open spots can be tolerated on the grate. A constant bed depth of 7 in. on the grate is maintained by means of a screed or cut-off plate.

The ACL kiln consists of a 12½-ft. wide traveling grate on 72-ft. centers, housed in a steel chamber approximately 84 ft. long, 15 ft. wide and 27 ft. high. A curtain wall 26 ft. from the feed end of the grate separates the chamber above the grate into two sections. known as the drying and hot sections, respectively.

This curtain consists of three sections of stainless steel plates with 3½ to 4 in. of castable refractories clipped on to the hot side. A steel curtain inside the grate has openings



The two 5- by 11-ft. 7-in. single-deck, fully-enclosed screens which provide minus ½-in. raw material for the plant.



This view of the grate-rotary kiln system shows the two 49-ft. dia. raw material homogenizing silos (left). The grate is in the building behind the silos, the cooler in the building at the right.

only for the grate chains, and there is a steel curtain below the grate also. The construction is such that there is very little air leakage between the four chambers. The roof over the grate has suspended Bigelow-Liptak flat arch construction, and the sidewalls have suspended precast sections. The hot section bottom hopper is lined with insulating block; the drying section bottom hopper is unlined. Access doors are provided at advantageous locations.

The grate consists of plate castings of cast iron containing some chromium, to provide better heat resistance and to prevent growing from the constant heating and cooling to which it is subjected. The grate castings are suspended between five independent chain strands, making a complete assembly. The top flight of roller chain rides on castings, the center track has guide flanges, and the lower or return flight rides on a series of roller supports, each consisting of five idler rollers on a shaft. Most of the stationary castings are made of—25 chrome 12 nickel steel.

Grate drive is at the rate of 30 in. per minute but this speed can be increased up to double if desired. It is driven by a 20-hp. d.-c. motor but actually draws only 6 hp. Drive is through a small Foote helical gear reducer, a Falk spring-torque clutch and a Foote worm gear reducer to a gear and pinion on the head shaft. The clutch is set to slip at a predetermined load in case the grate binds or drags; and when it slips, it breaks the power circuit to the motor. There is an Allis-Chalmers d.-c. synchronous-tie generator between the grate and rotary kiln sections but this is not now in use.

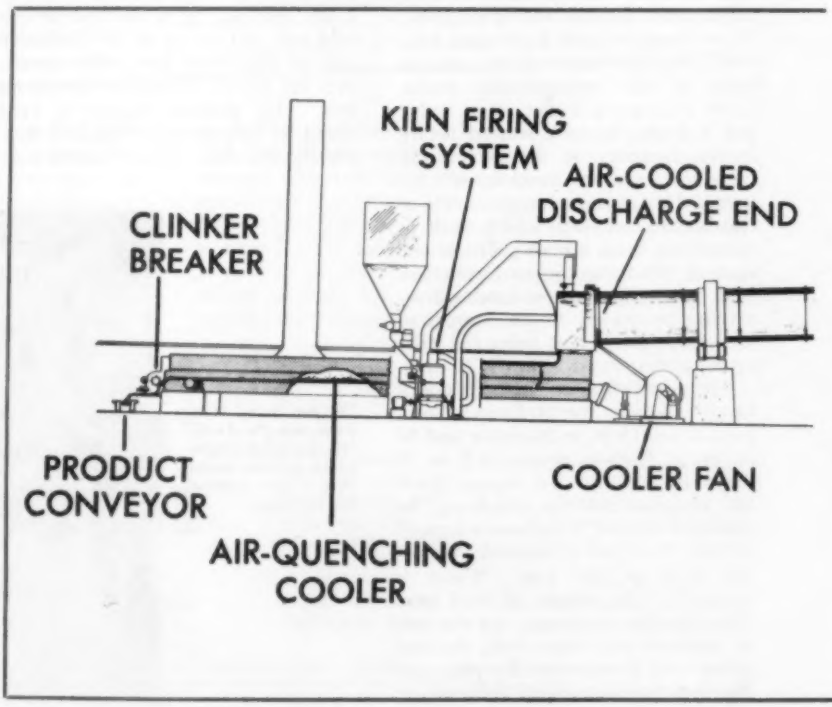
A special grate cleaner is used at the top of the grate at the feed end. This is a swing hammermill-type of mechanism with 940 blades ⅛ in. thick which clean out between the plates, etc. This is used once daily for a complete revolution of the grate.

The grate is followed by a 12½-by 160-ft. rotary kiln section in which the burning is completed at a temperature of 2,500 deg. F. The 1,800 to 1,900 deg. gases from the rotary kiln enter the upper section of the 43-ft. long hot or preburning zone of the ACL unit. In this section the temperature also ranges from 1,800 to 1,900 deg. F., and there is 0.1 in. negative pressure. The hot air is drawn down through the bed of dried pellets into the lower hot section. There the temperature is 500-600 deg. F., and there is 2.0 in. negative pressure.

The gases are drawn out of this lower chamber through three pairs of 4-ft. 9-in. dia. Buell cyclone dust collectors which remove dust before the air goes into the drying chamber. An 80,000-c.f.m. American Blower fan rated at 7-in. static pressure draws the hot gases from the rotary kiln through the hot chamber and the cyclones, keeping all of them under negative pressure, beginning with 0.03 to 0.07 in. at the kiln hood. These collectors not only prevent any dust from coating the moist pellet bed in the drying section, but also protect the fan.

The hot air leaves this fan at 550 deg. F. and is drawn down into the upper drying zone and through the bed of moist pellets on the grate. Upper drying zone temperature is

Elevation of the new kiln installation of the Diamond Portland Cement Company at Middle Branch, Ohio. At the left (below) is the rotary kiln section, where calcining is completed, and the air-quenching grate cooler. On the opposite page is the ACL grate preheating section.



500 to 600 deg. F., and there is 0.2 to 0.8 in. negative pressure. This slight increase in temperature from the lower hot zone is due to some leakage from the top hot zone into the top drying zone. This leakage is desirable in that it permits the fan to be adjusted to draw more heat in from the top hot chamber if the temperature in the upper drying chamber falls too low. The draft differential between the two upper chambers should not exceed 1 in. The temperature in the lower drying section is 250 deg. F., and there is 1.8 in. negative pressure.

Pressure in the two lower zones is kept about even, with the hot zone about 0.2 in. greater, so that any gas flow is away from the stack. The draft is created by a 70,000-c.f.m. American Blower fan rated at 5 in. static pressure. The moist pellets create no dust and they also prevent any dust from being drawn through the bed. This fan exhausts at 225 deg. F. to a 5- by 75-ft. steel stack. Both fans have motor operated dampers ahead of them for draft control which are controlled from the kiln board. The No. 1 fan is driven by a 150-hp. motor and the No. 2 by a 100-hp., both Allis-Chalmers.

When starting up cold with material on the grate, a steel auxiliary stack over the top hot chamber of the grate is opened, and the rotary kiln is fired until almost hot, the kiln being rotated and material being fed to it intermittently from the grate. When a temperature of 1,600 deg. F. is reached in the ACL unit, the stack is gradually closed off, and the process then operates continuously. This startup takes about 3 hours.

The stack also makes it possible to fire the kiln for short periods without operating or passing gases through the grate. When the kiln is started up after a short shutdown, the hot chamber receives heat from the operating rotary section, and the grate with dry pellets is started up as the stack is closed.

Under normal operation the stack is closed. Closure is at the top of the 40-ft. stack for best results as a cushion of air then protects the stack gate from the high temperature. For the same protection when open, the gate is of unusual design, consisting of a dish-shaped cap supported on four motorized vertical rods outside the stack which are controlled from the kiln board.

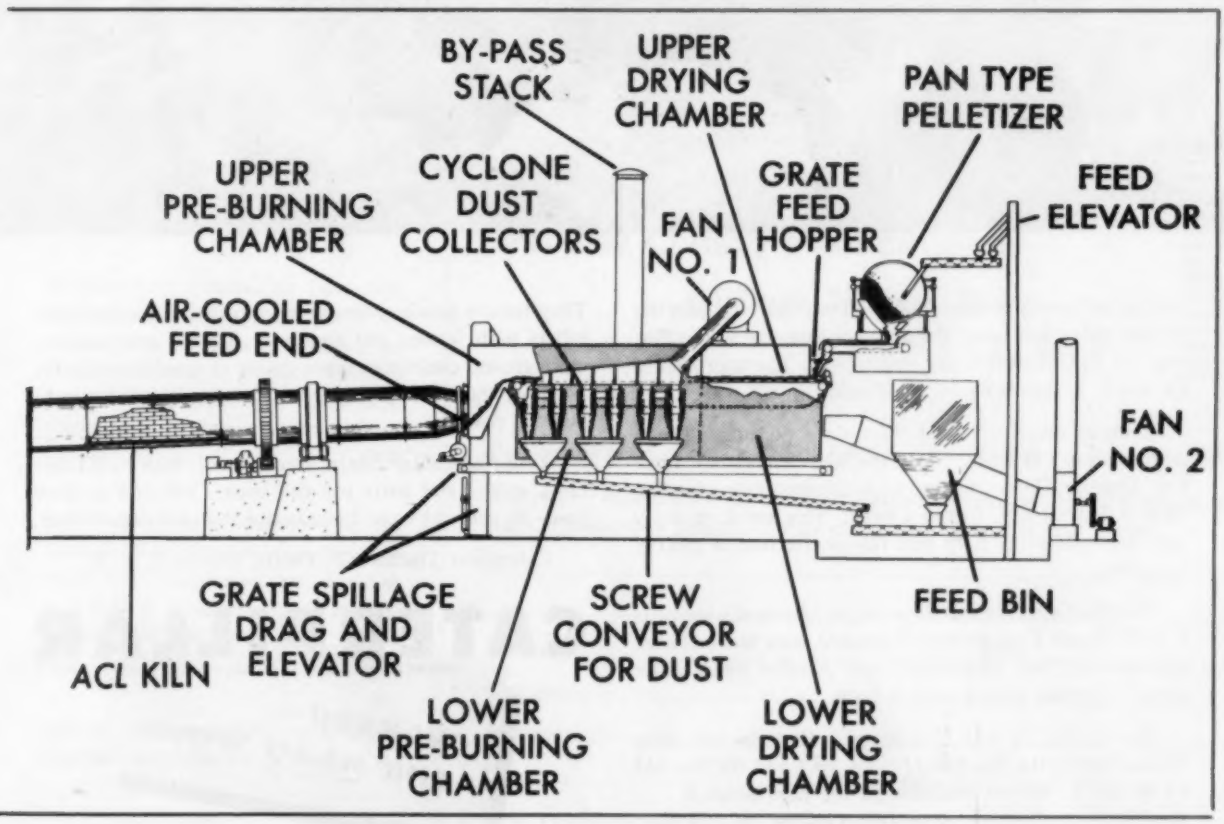
The dried and partially-burned pellets are discharged from the grate onto a discharge chute to the rotary kiln. The grate fall-through is carried by an 85-ft. drag-chain conveyor to a bucket elevator to the discharge chute. The dust collected in the cyclones is carried by a series of screw conveyors to one of the raw material bins preceding the pelletizers.

Rotary Kiln The 12-ft. 6-in. by 160-ft. Allis-Chalmers rotary kiln has a tapered feed end and is mounted on two riding rings. It is lined throughout with 6-in. brick—70 percent alumina for 80-ft. in the burning zone, and abrasion-resisting brick elsewhere, including 8 ft. at the discharge end. Both ends of the kiln are air-cooled—the feed end using a small blower and the hood end bleeding air direct from the clinker cooler fan. Both ends have special counterweighted seals.

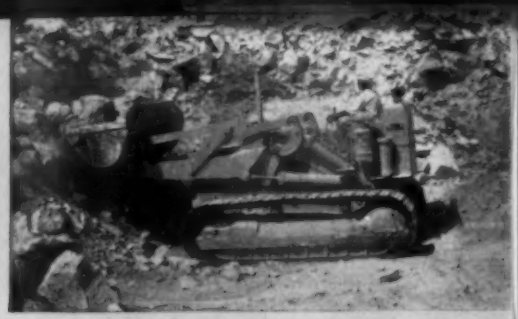
The kiln has a slope of 3/8-in. per ft. and is being driven at 66 r.p.h., but a top speed of 75 r.p.h. can be obtained. The drive consists of an Allis-Chalmers 60-75-hp. d.-c. motor, a gear reducer and the ring-and-pinion gears. A gasoline engine auxiliary drive is provided.

Coal Ordinary 12,500-B.t.u. Ohio coal is crushed before going to a 60-ton hopper in the burner

(Continued on page 105)



Here's how to dig profits out of a quarry



Swiftly and surely it bites into the limestone. Up goes the bucket, full at first pass. The operator turns the Caterpillar No. 977 Traxcavator easily, effortlessly. The approach to the truck, a smooth dump, then back.

Look at the No. 977 in these three pictures. That's performance! It loads trucks for the Whitestone Lime Co., Leander, Texas, in 2½ to 4 minutes, keeps loading them 9 hours a day, 7 days a week. This speed, capacity and dependability help put the profit into a quarry operation.

No other machine can do so many jobs so efficiently as a CAT Diesel Traxcavator. Equipped with quick-change attachments, this all-purpose tool handles chore after chore. You can always keep it busy.

Besides the No. 977 (2¼ cu. yd.), there are two other Traxcavators: the No. 955 (1½ cu. yd.) and the No. 933 (1 cu. yd.). All are available in the new Series E . . . specifically engineered for greater economy on rock jobs. They feature heavier idlers; solid sprockets; tougher track rollers with frames and guards of heavier construction; more ground clearance; lower center of gravity for better handling and stability; lower transmission speeds for more bucking power.

Your Caterpillar Dealer stands ready with round-the-clock service and parts you can trust. Tell him to show you—*on your job*—the Traxcavator that will pay off best.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

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WANTED—THE HARD WORK

Enter 100 on card, page 101

More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

HYDROSEAL SAND AND DREDGE TYPE PUMPS for handling abrasive solids over 4 mesh are described in Brochure No. 657, published by *The Allen-Sherman-Hoff Pump Company.* **(321)**

A DUST COLLECTOR BULLETIN available from *The Ducon Company, Inc.*, covers the firm's complete line of wet and dry type dust collectors and auxiliary equipment, including cyclones, centrifugal and dynamic washers, dust and fiber filters, discharge gates, and trickle valves. **(322)**

THE WHITE MOTOR COMPANY has made available to its service and parts customers a new "Parts Want Book." **(323)**

"V-BELTS, the Testing, Inspection, and Control of Their Quality," a 16-page booklet issued by the *Goodyear Tire and Rubber Company,* describes how raw materials and finished belts are tested and inspected. **(324)**

SPECIAL LUBRICANTS for open gears, dipper sticks, and cams are the topic of a folder published by *The Whitmore Manufacturing Company.* Fifteen Whitmore formulas are described. **(325)**

MANGALLOY PRODUCTS FOR THE REPAIR OF WORN EQUIPMENT are illustrated in a booklet prepared by the *Ford Steel Company.* Products described include welding electrodes, wedge bars, dipper tooth repointers, applicator bars, and steel plates. **(326)**

JAW CRUSHERS manufactured by the *Kennedy Van Saun Manufacturing & Engineering Corporation* are described in a bulletin containing details on four models, from 10- by 36-in. to 30- by 42-in. feed sizes. **(327)**

POWER TRANSMISSION AND CONVEYING MACHINERY is covered in *Chain Belt's* Catalog 610, which provides descriptions, specifications, application information, and selection data on the products. **(328)**

LINCOLN LUBRICATING EQUIPMENT is illustrated in a catalog from the *Lincoln Engineering Company.* Features of lubrication fittings, grease guns, centralized power lubrication systems, and accessories are described. **(329)**

CLAMSHELL BUCKETS are detailed in a specification bulletin released by the *Schield Bantam Company.* Included are complete specifications and action photos of the general purpose ⅜ cu. yd. and the special 1½ cu. yd. rehandling buckets. **(330)**

HOBART ARC WELDING NEWS, Vol. 14, No. 4, a 16-page booklet on welding published by the *Hobart Bros. Company,* includes illustrated articles featuring time and money saving applications. **(331)**

MOLYKOTE TYPE BR-2 LUBRICANT, packaged in cartridges and applied from a grease gun, is covered in Bulletin 114, issued by *The Alpha-Molykote Corporation.* **(332)**

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February ***PIT AND QUARRY*** **1958**

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More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

MODEL 805 EXCAVATOR is the subject of a bulletin prepared by the *Koehring Division*. Photos show job applications of the unit, which can be used as a 2 cu. yd. shovel, a 2 to 3 cu. yd. dragline or clamshell, or a 52 ton lift crane. **(333)**

NI-HARD CASTINGS are covered in Bulletin 263, issued by the *Nordberg Manufacturing Company*. Included are photos of a variety of finished castings and data on physical and chemical characteristics of Ni-Hard. **(334)**

MODEL TX-24 SCRAPER is featured in Form 554 released by the *Euclid Division*. The booklet covers all features of design, operation, and performance, illustrating major components of the unit. **(335)**

DUST CONTROL EQUIPMENT manufactured by *The W. W. Sly Manufacturing Company* is pictured in Bulletin 104, which gives specifications and engineering data for Dynaclone and shaker-type dust filters. The booklet also provides information on how to engineer a dust control system. **(336)**

MERIDIAN STEEL COMPANY, INC., offers a catalog covering its complete line of steel and steel products, including bars, plates, tractor grouser bars, dozer blades, tool bits, etc. **(337)**

THE MANITOWOC AGITATOR for cement slurries is detailed in a booklet published by *Manitowoc Shipbuilding, Inc.* Included is a table of slurry density relations, a blowing chart, and a diagram of a normal agitator arrangement. **(338)**

BALL AND ROD MILLS with steel heads, manufactured by the *Denver Equipment Company*, are featured in Bulletin B2-B20, which contains features and dimensions of the 7 ft. and 8 ft. mills. **(339)**

BULLETIN NO. 1950 on large induction motors has been published by *The Louis Allis Company*. Detailed information is given on a full line of motors in ratings from 150 to 1250 hp. **(340)**

INDUSTRIAL DUST CONTROL utilizing the new Day Type "RJ" dust filter is described in a bulletin released by *The Day Company*. Dimensions, specifications, and illustrations of five basic "RJ" units are included. **(341)**

BLACK DIAMOND SINGLE-ROLL CRUSHERS are detailed in an 8-page booklet from the *McLanahan & Stone Corporation*. Construction and design features, dimensional drawings, and capacities are included. **(342)**

A FLEXIBLE COUPLING BULLETIN published by *T. B. Wood's Son's Company* simplifies the selection of new "Sure-Flex" couplings, suited to more than 150 different applications. **(343)**

THIS IS KEOHRING, a 40-page brochure recent released by the *Koehring Company*, presents a history of the company and its divisions and subsidiaries. **(344)**

BLASTING CAPS are described in a booklet prepared by the *Hercules Powder Company*. Diagrams illustrate the internal structure of seven types of blasting caps. **(345)**

February ***PIT AND QURRAY*** **1958**

Insert key numbers found below items on advertising, literature, and new equipment pages. Print company name if not keyed.

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Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

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CHICAGO 5, ILL., U.S.A.

This Bucyrus-Erie 770-B walking dragline swings a 20-cu. yd. bucket on a 195-ft. boom digging shells for a cement manufacturer in Florida.

IN THE LOW COST PRODUCTION RACE A WALKER SETS THE PACE . . . Bucyrus-Erie Walking Dragline

The economical operation, big production and year-after-year dependability of Bucyrus-Erie walking draglines make them pace setters wherever big volumes of material must be moved at lowest possible cost. You'll find them in quarries, mines and on large construction projects from Minnesota to Morroco . . . from Florida to the Philippines.

Heavy-duty construction from base to boom point cuts maintenance costs, adds years to machine life. Each machine has *proved* Bucyrus-Erie design superiority — a front end that's very strong yet light in weight — exclusive walking action with design simplicity that reduces maintenance, gives you cushion-smooth moveups. These and many other features combine to give you a high-volume, low-cost-yardage excavator that sets the pace wherever it works.

151157C

Enter 103 on card, page 101

A Familiar Sign . . . BUCYRUS ERIE *. . at Scenes of Progress*

BUCYRUS-ERIE COMPANY • South Milwaukee, Wisconsin

IT'S A REAL ROCK DIGGER

Since they switched to a "Jimmy" Diesel

Want more work from *your* shovel? Then take a tip from T. B. Gatch and Sons, Inc., who operate a quarry near Churchville, Maryland.

They replaced the gasoline engine in this 1½-yard machine with a GM "6-71" Diesel a year ago. Results: 50% higher production. Two-thirds less fuel cost. Full capacity for work from half to full throttle. Less vibration and smoother operation that means longer life for boom, cables and other working parts. Says Senior Partner T. Ashby Gatch, "We can throttle the GM engine down and still retain ample power for the toughest rock digging. For boom swing we have the 'Jimmy's' quick acceleration, saving us time every cycle. There's no loafing on the job—this unit is now a real rock digger."

Taking tough jobs in stride is everyday work for GM Diesel-powered equipment. The 2-cycle "Jimmy" Diesel gives lightning response to power demands, operates on low-cost fuel and delivers years of dependable, trouble-free service. Specify GM Diesel when you order new equipment—ask your GM Diesel distributor about repowering old machines.

DETROIT DIESEL Engine Division of General Motors, Detroit 28, Michigan

GM GENERAL MOTORS DETROIT DIESEL POWER

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Now—more than ever—it pays to standardize on GM Diesel—available in 1485 applications of power equipment built by more than 175 manufacturers

Parts and Service Worldwide

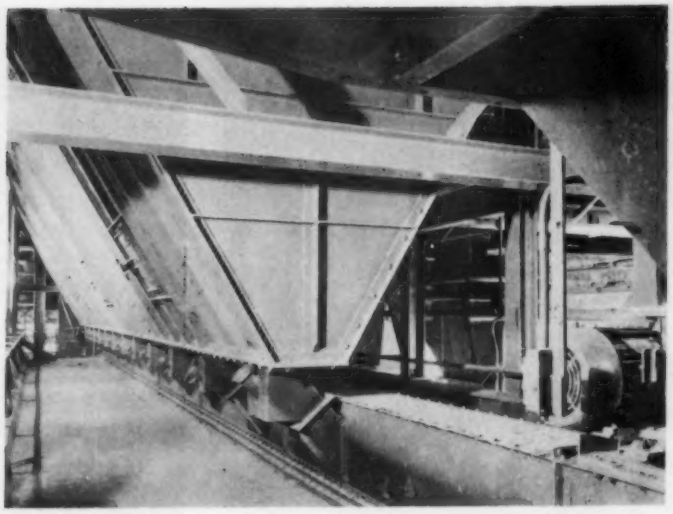
A GM "6-71" Diesel powers Northwest 1½-yd. shovel operating in quarry of T. B. Gatch and Sons, Inc., Baltimore, Md.

Enter 104 on card, page 101

Diamond Portland

(From page 99)

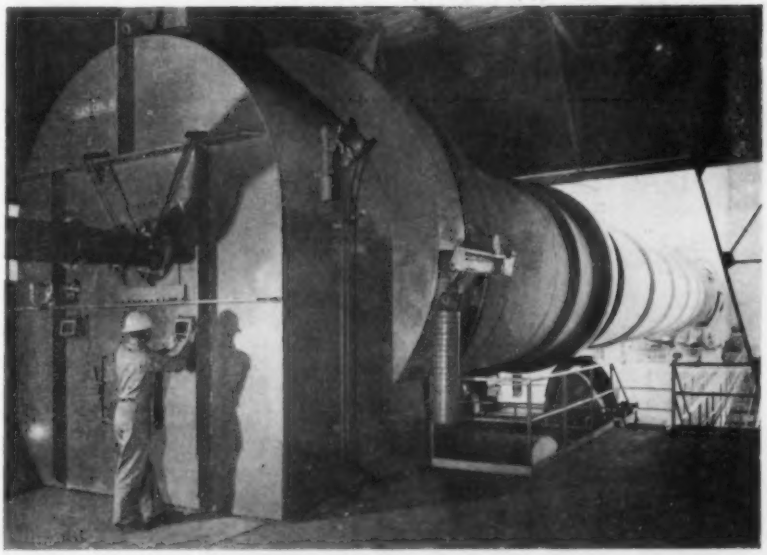
Right: The hopper under the grate kiln section which collects spillage from the grate. The drag-chain conveyor carries spillage to the elevator to the kiln feed spout.



building. A 200-lb. Richardson batch scale feeds the coal to the Raymond No. 428 direct-firing bowl mill. This unit draws drying air from the kiln hood through a cyclone and/or from the clinker cooler. The coal mill outlet temperature is held at 150 deg. F.

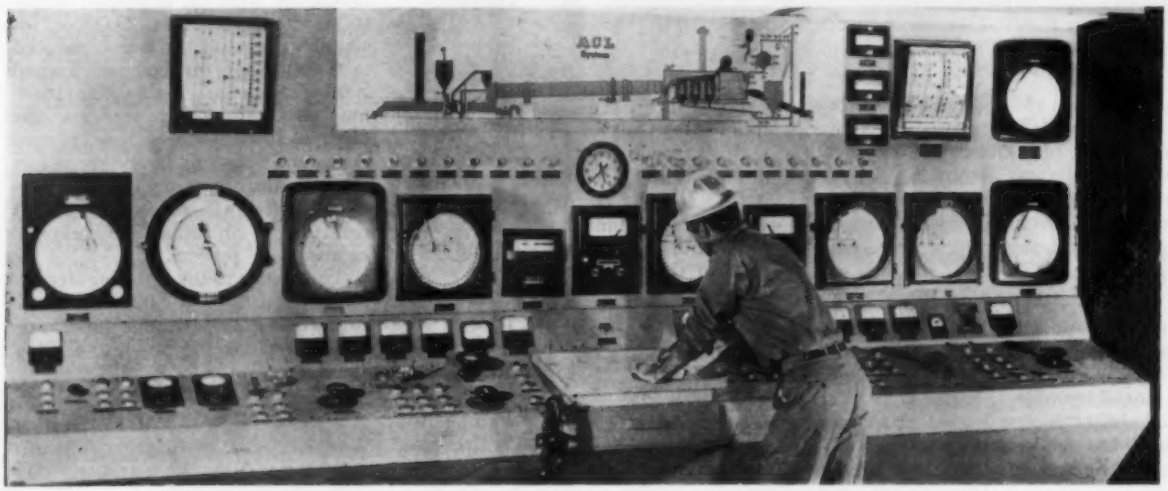
Cooler The clinker is discharged from the kiln to a 6- by 100-ft. Allis-Chalmers oscillating, air-quenching clinker cooler. Cooling air is provided by a 150-hp., 150,000-c.f.m. fan. In order to give better distribution of the air, there is an overgate baffle near the feed end. There is also a pulsating damper in the duct from the fan to the cooler. The baffle helps to provide the kiln with the hottest air from the cooler, while the rest is diverted to the stack. Drying air for the coal mill is taken off at a point just past the baffle in order to get the hottest of the waste air.

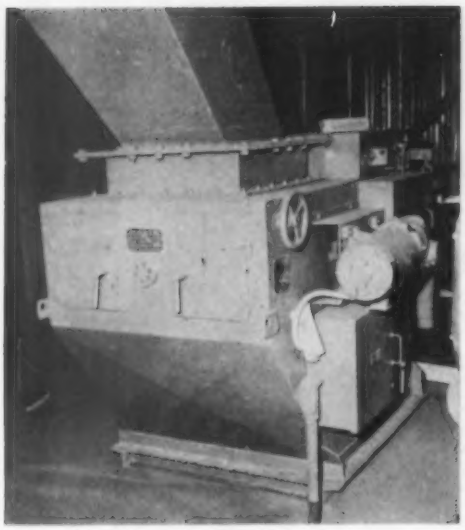
The clinker passes through a breaker before being discharged, cool enough to grind immediately, on a 36-in. by 20-ft. Carrier oscillating conveyor, which discharges to either of two bucket elevators, one a standby. A belt conveyor carries the clinker to the storage building, into which it is discharged by means of a tripper. An ABCs (McDowell Co.) conveyor



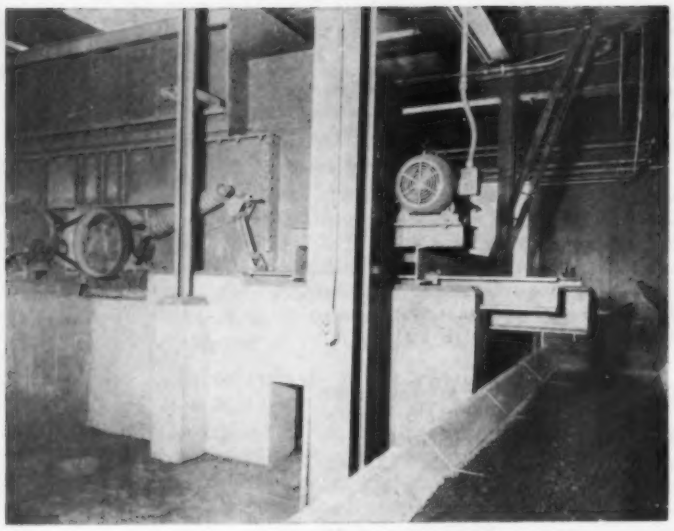
The kiln hood and the 12-ft. 6-in. by 160-ft. rotary section of the grate-rotary kiln. Note the optical pyrometer in the hood and the counter-weighted sealing ring.

Below: The control panel for the entire kiln system, from the pelletizing pans through the clinker cooler. Note the diagram of the kiln system (top) with indicating lights.

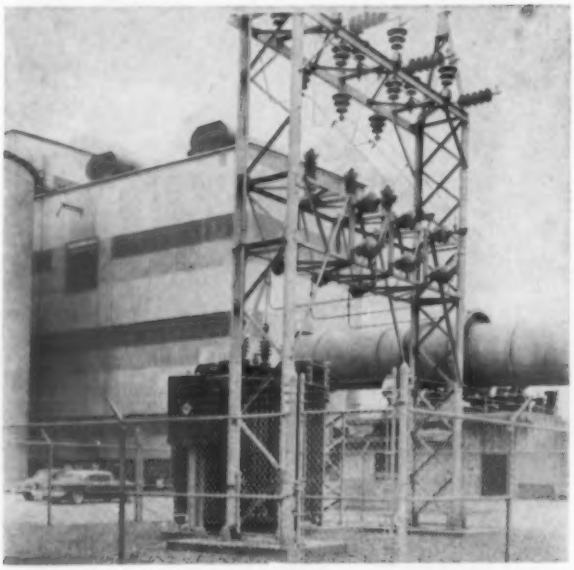




The 200-lb. batch scale which feeds coal to the direct-firing bowl mill for the kiln.



From the 6- by 110-ft. air-quenching cooler, clinker is discharged onto the 36-in. by 20-ft. oscillating conveyor to storage.



The 5,000-kv.-a. primary substation which supplies power at 4160 v. to load center substations in the screen building, mill room, and kiln building.

scale keeps a record of clinker output. This storage also receives the clinker from the old kilns. An overhead traveling crane rehandles clinker and gypsum in the storage and out to the finish mill feed bins.

Kiln Control In the operation of this system the kiln board control actually begins at the ACL unit, but there is a communication system between the pelletizing pans and the kiln floor. The kiln control console, provided by Allis-Chalmers, is completely instrumented and has 44 instruments.

At the top of the board is a diagram of the entire kiln system, from the feed tanks through the cooler, with lights which indicate at a glance if everything is operating properly. At this same level are the following: draft gauges and recorders for the kiln hood, the coal mill inlet and outlet and the four zones in the grate section; temperature indicators and recorders for the same points; an oxygen analyzer; speed indicators, etc. Lower down are pushbuttons, ammeters, voltmeters, damper position indicators, etc. According to Diamond personnel, the entire system is easy to control if all instruments are used as intended.

Finish and Storage At present the four old finish mills are being used, but the three old raw mills are being rebuilt for clinker grinding and will be operating soon. There will then be six 7- by 24-ft. Compeb mills driven by 450-hp. motors, and a 7- by 28-ft. Compeb mill driven by a 600-hp. motor. Five of the six 24-ft. mills have 14-ft. separators, and the 27-ft. mill has a 16-ft. separator. The finished cement is stored in silos with 185,000-bbl. capacity.

Electrical The electrical distribution system for the new equipment in this plant is the load center type, designed to give adequate protection against overload and fault conditions, with the minimum of distribution losses. The 23,000-v incoming power off the line is reduced to 4,160 v. at the company-owned 5000/6250-kv.-a. main substation. Standard protective features are used, such as lightning rods, disconnects, and fuses. From the secondary of the transformer the 4,160-v. current goes to high-voltage switchgear consisting of an incoming line breaker and three feeders.

The feeder to the crushing department consists of a 500-kv.-a. load-center substation with a 480-v. secondary feeding the 500-hp., 4,160-v. crusher motor.

The feeder to the mill department is a 750-kv.-a. load-center substation. The 1,100-hp. raw mill motors run on 4,160-v. from high-voltage start-

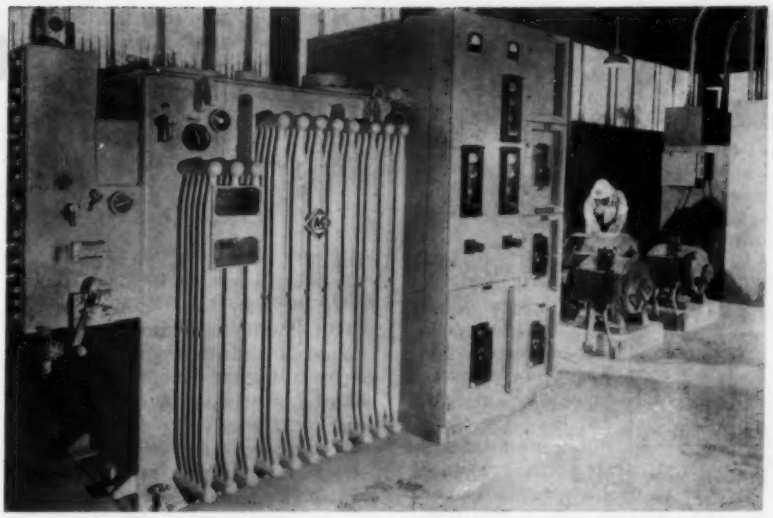
ers tied to the load side of the incoming line breaker.

The kiln department feeder consists of two 750-kv.-a. load-center substations. Only motors of 250 hp. or over are 4,160-v.; all others are 440-v.

All d.-c. motors in the new section of the plant are 230 v. and are fed by a constant-potential d.-c. source consisting of three 60-kv. motor-generator sets, one a spare. D.-c. motors drive the raw material feeder screws, the pans, grate (except when on synchronous tie), kiln, cooler, and the pulsating damper.

Miscellaneous The overall design of the additions to this plant was done by W. R. Bendy, cement engineers. The structural design, plant layout, and construction were done by the Macdonald Engineering Co. in co-operation with Bendy engineers. Most of the equipment, including the ACL kiln, was supplied by the Allis-Chalmers Mfg. Co., which also co-operated in details of the design.

Officers of the Diamond Portland Cement Co. are: R. D. Raff, president and treasurer; E. H. Raff, executive vice-president; W. D. Correll, vice-president, sales; E. R. Evans, vice-president, operations; and R. D. Raff Jr., secretary; F. M. Campbell, assistant secretary and assistant treasurer. R. T. Capp is plant manager, C. R. Rinehart is chief chemist, and L. M. Sell is chief engineer.



The 750-kv.-a. load center substation in the mill building with two 25-kw. motor generator sets for mill motor excitation, d.-c. panel, and motor starters (rear).

Appointments and Promotions

The New Haven Trap Rock Company, New Haven, Conn., has appointed LEWIS P. JONES superintendent of asphalt production at its six plants in North Branford, North Haven, Wallingford, and Plainville, Conn., as well as director of the firm's asphalt expansion program.

Mr. Jones was previously project manager for the Union Building and Construction Corporation of Passaic, N. J., and had been in charge of constructing the Connecticut turnpike in Guilford and Madison, Conn. He was also manager of Jones Superior Humus Company and superintendent of Pequonnock Sand and Gravel Company, Union subsidiaries.

The Ruberoid Company, New York, N. Y., has announced two appointments: THOMAS A. DENT, director of engineering, and CHARLES LLOYD SELL, assistant general traffic manager, both with headquarters in South Bound Brook, N. J.

Mr. Dent has been special assistant to the vice-president of manufacture at Ruberoid, and Mr. Sell was formerly traffic analyst for Union Carbide Corporation.

Nine promotions in the sales division were announced by Universal Atlas Cement Company, New York, N. Y., U. S. Steel Corp. subsidiary.

FRANK J. WHITMAN was appointed manager of sales of the Central Region, with headquarters in Chicago, Ill. He has been with Universal Atlas since 1918, becoming sales manager of the Chicago territory in 1947, a position he has held until his current appointment.

F. J. Whitman

W. M. Tomlinson

WILBUR M. TOMLINSON was named manager of sales of the Western Region, with headquarters in Kansas City, Mo. He has been with the firm since 1928, and was formerly sales manager in Kansas City.

The four new sales managers and their respective districts are THOMAS E. BERTELSEN, Kansas City; JAMES E. TAYLOR, Illinois; AUWELL FOGARTY, Indiana-Michigan; and HAROLD MEYER, Milwaukee.

Assistant sales manager appointments and their territories include ROY D. HOLLOWAY, Illinois; CHARLES E. NEWTON, Indiana-Michigan; and JOHN W. ETTINGER, Kansas City.

WALTER H. HOOD was promted to manager of the Industrial Minerals Division's Canadian Flint and Spar Department by International Minerals & Chemical Corporation, Chicago, Ill. He succeeds Norman B. Davis, who has been named a consultant for the company.

CLARENCE L. RUDD, sales engineer for the Janesville Sand & Gravel Company, Janesville, Wis., has been appointed acting sales manager of the company. The late John Husen, vice-president, was formerly in charge of sales.

CECIL D. MILLER has assumed his duties as district engineer for the Oklahoma City district office of the Asphalt Institute. Mr. Miller was formerly district engineer with the Clay Products Association.

Value and Validity of Patents

BY LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

OCCASIONALLY an inventor inadvertently suffers a loss because he has an inadequate knowledge of patent laws. One producer of nonmetallic materials stated his confusion thus: "If an inventor gets a patent, why can't he stop competitors from making and selling his invention? What is meant by 'claims' in a patent?"

Some light may be shed on this query by considering the following excerpt from a letter:

Importance of Claims

"Several months ago I applied for and was given a United States patent on my invention for a new improvement on a cement finishing machine. A few weeks ago I learned that a company in the East is manufacturing and selling (an article) exactly (the same as) my invention. I consulted a patent lawyer, intending to sue this corporation for infringement of my patent. This lawyer told me that it may be useless for me to file the suit because it is doubtful that I can win the case. He said that the 'claims' in my patent are weak and (that) they will not win the suit for me. My drawings and also my specifications show and describe exactly what this infringing company is manufacturing. Why can't I get damages from this company for infringement? I spent over $500 to get my patent, and what good is my patent if another company can make and sell my invention without paying me royalties? If the patent lawyer was at fault in getting me a patent, what will the court do about this?"

This unfortunate inventor is having the same disappointment numerous other inventors and patentees have experienced. However, a patentee has absolutely no protection against any person or company making and selling what is not "claimed" in his patent, although it is shown in the drawings, and explained in the specifications and descriptive matter of the patent.

In other words, an inventor is protected only by the "claims" in his patent. Numerous higher courts have laid down and upheld this law. Recently a higher federal court sustained it in a case involving oil filters.

For example, in *Winslow Engineering Company v. Smith,* 233 Fed. (2d) 438, the testimony showed that an inventor named Winslow obtained a patent on oil filters. One of the problems that has been confronting manufacturers of oil filters is their tendency to clog or fill up within a limited time, and thus require frequent replacement. The particles carried in the oil, which must be filtered out, are deposited on the outside surface of the filter, and within a comparatively short time all of the pores through which the oil is to be filtered are closed off, and the filter surface then has a "slick over." This has been found to be true whether the filter is made of cloth, metal, or other material.

Winslow undertook to bring together a combination of old parts in such manner as to provide a filter element which would extend the life of the oil filter and postpone the point at which the absorbent filtering material behind the filter surface would be completely filled with this foreign matter. Winslow's casing is knitted, not woven, and its openings gradually become larger, permitting more and more of the solids in the oil to pass through and lodge in the interior filter.

Although all of the elements described by Winslow were found in various old and prior patents, the higher court held Winslow's idea of combining old elements was patentable because his combination produced new and useful results.

"This combination presented a growth factor accompanied and supplemented by the expanding of openings in a filter cloth to allow that growth to continue and to prevent slicking over until maximum utilization of the interior filter mass had been accomplished," the court stated. "Hence, we think invention was here present. Thus we have invention. . . It measures up to the standards for invention which this court has previously had occasion to approve."

Nevertheless, the higher court held the patent invalid and not infringed by others because none of the *claims* in the patent clearly explained the invention. This court pointed out that although the drawings and specifications clearly showed and explained the invention, the patent did not have proper and strong *claims.* Hence, the inventor has no protection against infringement of his patent. In this respect, the court said:

"It is true that the specifications, when read with the drawings, if added to or incorporated in these claims would accomplish the required limitation necessary to specify the combination constituting the invention."

It must be noted that in this case the inventor was entitled to "broad" claims in his patent. However, since these proper and broad claims were not included in the patent, the court would not take this into consideration and assist the inventor to stop competitors from infringing his invention. In other words, *the value of a patent depends upon the contents of its claims.*

Inventive Genius Required

The law is established that a valid patent may comprise a combination of old and well known elements, if the combination requires *inventive genius* to assemble and invent. On the other hand, if only mechanical skill is involved, the inventor usually can obtain no patent; and if the Patent Office allows such a patent, the higher court will hold it invalid.

For example, in the leading higher court case of *Whiteman v. L. G. Mathews,* 216 Fed. Rep. (2d) 712, the testimony showed these facts.

A man named Whiteman obtained a patent No. 2,198,929 for a cement floor finisher. This patent contained the following claim: A cement floor finisher comprising a vertical shaft, (the) means for rotating said shaft, a plurality of trowels radially arranged with respect to the shaft and adapted to be rotated thereby, each

trowel being tiltably mounted, a thrust collar on the shaft, arms on the trowels actuated by the thrust collar, and means for varying the position of the thrust collar on the shaft whereby the tilt of the trowels may be varied.

An important advantage and benefit of the invention is that the trowels may be adjusted to the pitch or tilt which is suitable to the texture or consistency of the particular surface being finished. These adjustments are conveniently made because each trowel is so mounted that it may be quickly turned to an angle relative to the surface being finished simply by turning a knob on the handle of the machine.

Whiteman brought suit charging a man named Mathews with infringement of his patent. Mathews denied infringement and asserted the invalidity of the patent. In other words, Mathews contended that Whiteman's patent is invalid because an old patent on a cement finishing machine disclosed all of the elements of the Whiteman patent except a thrust-collar and knob for changing the pitch of the trowels while in motion.

The higher court held Whiteman's patent invalid, stating that the addition to the old finishing machine of the thrust-collar and knob for changing the pitch of the trowels while in motion involved no more than the exercise of the ingenuity to be expected of a mechanic skilled in the art.

"The testimony is to the effect that the functions and uses of a thrust-collar are within the field of common knowledge possessed by all skilled mechanics," the court pointed out. "On the basis of this testimony, there would seem to be no question regarding holding the claims in suit invalid for want of invention."

Therefore, Whiteman could recover no damages from Mathews for infringing his patent claim.

What Is Patentable? Before an inventor expends time, money, and effort in filing an application for a patent, he should know what cannot be patented. Higher courts have decided that certain things are not patentable; and by observing the following taboos readers may readily determine what things are not patentable, and therefore avoid endeavoring to obtain a patent on an unpatentable invention.

The higher courts have held these things not patentable: a mere idea, without a description of practical mechanical means to make the idea mechanically operative; a mere result, or function; a thing having an immoral object; a scientific principle; any thing or device created by mere mechanical skill; an aggregation of old and well known parts; all devices that cannot be practically operated; a mere idea or system for doing something, without mechanical means for putting the system or idea into effect; all devices that are not new and useful.

Preliminary Preparation Another important point of law is that no inventor should expend valuable time and money *experimenting* with or filing an application for a patent before he has good reason to believe that his invention is new, and therefore patentable.

If you plan to seek a patent, have a reliable patent lawyer make a complete search of the Patent Office records for the purpose of locating at least four of the nearest previously issued patents to your invention. Very often, for example, an inventor of a valuable device may die, or otherwise become disinterested in his patent, with the result that while you may consider your invention new, this is not true; and hence you cannot obtain a patent on your idea or invention, because a prior patent discloses the same or an equivalent to your invention. You cannot expect to have information of prior patent, which may clearly anticipate your chances of obtaining a valuable patent, unless you have a search made of prior patents in the same classification as your invention.

Not long ago the writer made a search of the Patent Office records for an inventor who finally, after three years of expensive experimentations and time consuming efforts, perfected what he believed to be a new automatic device. Both he and I were surprised when the returns of the search disclosed a patent which had been issued 10 years previously for an invention almost identical to his.

This inventor could have saved himself three years of effort and experimentation and considerable incidental expense if he had had a reliable search made of the Patent Office records, *when he first conceived the idea of his invention.* Make sure that it is a reliable search. Of course, if an inexpensive and unreliable search is made of the Patent Office records, the nearest patent to your invention may not be located. Hence, after expending money to file an application for a patent and waiting a year or so, you may learn to your sorrow that you cannot obtain a patent on your invention. See the late *United States Court of Customs and Patent Appeals,* 223 F. 497.

Follow Legal Rules Since the total cost of obtaining a patent frequently runs into several hundred dollars, the economical procedure available to get protection without filing a patent application is important.

No plan or procedure is available for protecting an invention against infringement unless the inventor files an application for a patent in the United States Patent Office. This is so because our patent laws were devised for the primary purpose of inducing inventors to file applications for patents in which details of the invention must be clearly illustrated and explained. After 17 years the patent expires; the invention is then public property, and any person may consult and read the patent and learn how to make the invention.

On the other hand, if the inventor does not intend to file an application immediately for a patent, he should do everything possible to prove to a court later the exact date he began experimenting on the invention, the exact date he perfected the invention, and the exact date he reduced the invention to practice or demonstrated the first model of the invention to a disinterested person.

If an inventor does not intend to file an application immediately for a patent on an invention, he should prepare his evidence to prove that he was the "first" person to conceive the invention and construct an operative model.

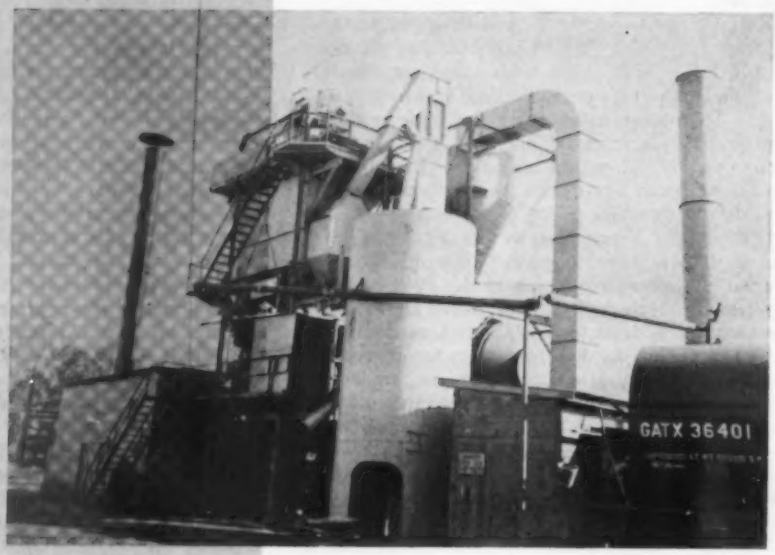
Proper Procedure Obviously, if an inventor has perfected his invention, the safest and best plan is to file an application for a patent. If, on the other hand, the inventor has not perfected the invention, these are proper steps to take:

(1) He should make written notes and explanations of every experiment, and date these various sheets, bound permanently in book-form. (2) He should have a dependable person witness an experiment, or the operation of the invention, whose name and address should be written on the dated sheet on which the experiment was made or the invention disclosed. (3) When the device is perfected, the inventor should file an

(Continued on page 122)

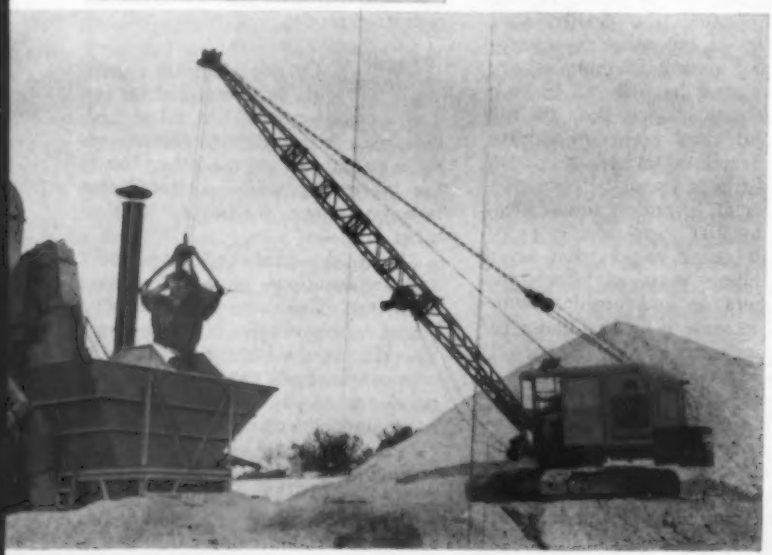
Ames & Webb, Inc.

Asphaltic concrete capacity doubled at Virginia plant



In this overall view of the front of the plant are (from left to right): the boiler room, mixing plant, dust silo, and an incoming tank car of asphalt.

One of the two clamshell cranes used for unloading rail shipments of aggregate, and for rehandling of the aggregates from stockpile to plant feed hopper, as shown here.



By **BUREN C. HEROD**

INCREASING demands of industrial development and federal housing recently led Ames & Webb, Inc., a contracting firm in Norfolk, Va., to more than double its output of asphaltic concrete and related materials. The gain in capacity was realized by the installation of a new automatically controlled 100-t.p.h. asphalt mix plant.

The new unit, a Simplicity System Co., model S-100, was set up on the same site where the firm had operated a smaller, 40-t.p.h. 1928 model plant for about 15 years. While erected and operated primarily to supply Ames & Webb's own construction activities, the plant also provides materials for some sales to other organizations.

Equipped with a batching system that incorporates automatic control of the weighting of aggregates and asphalt, as well as of each phase of the entire mixing cycle, the plant can

also be operated through a remote control that allows a driver to spot his truck below the plant's pugmill discharge gates, push a button, and draw from one to six batches automatically. A red light signals the driver when loading has been completed. In routine operations, the plant operator is stationed at a control console above the truck drive-through.

Although the plant was erected at this location in east Norfolk, in 1956, as a permanent installation, it is comprised of portable components which may be dismantled and hauled on highway running gear. Situated near the main line of the Virginian R.R., and on the Belt Line R.R., the plant is supplied by rail with all aggregates and bitumens from local sources. The asphalt is received primarily from the Texas Company in tank-car lots. Aggregates used are all minus 2-in. as follows (with state specification numbers):

No. 15	passing	¼-in.
No. 11	"	½-in.
No. 9	"	¾-in.
H31	"	2 -in.
H32	"	1½-in.

Screenings minus 4-mesh

Rail shipments spotted on the plant spur are unloaded by Northwest and Lorain cranes equipped with ¾- and 1-cu. yd. Owens clamshells, respectively. Aggregates are stockpiled by these units, which, along with a Hough 1½-cu. yd. front-end loader, also rehandle the materials from stockpile to the plant feed hopper. Up to 6,000 tons of aggregates are maintained in the individual stockpiles.

The plant feed hopper having a capacity of 40 tons, is divided into three compartments for individual handling of the respective aggregates. These are transferred from the hopper to the boot of a 25-ft. double-chain bucket elevator and raised to discharge into a dryer.

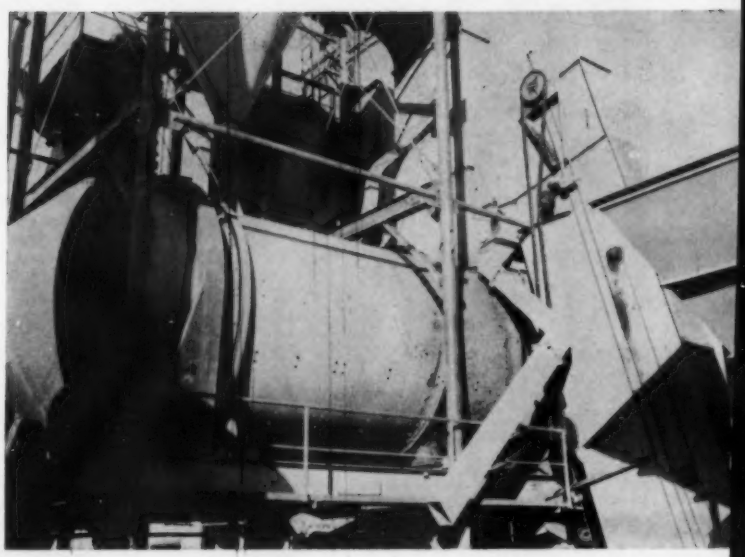
Fed at the rate of 100 to 120 t.p.h., this dryer is a horizontal 10- by 20-ft. double-shell unit, driven at about 9 r.p.m. by a chain-coupled 100-hp. motor and Falk speed reducer. The dryer motor and all others in the 350-hp. total connected load of the plant are G.E. equipment. Drying temperature is maintained at about 300 degrees F., and firing with Bunker C fuel oil is done through a No. 12 ray burner. Aggregates are moved through the dryer by inner flights that move the material from the feed (front) end to the rear and back to discharge at the front end.

The hot drying air is drawn through the dryer by a 750-r.p.m. Clarage fan driven through V-belts by a 100-hp. motor. Hot gases and dust exhausted are then passed through a 10- by 30-ft. washing tower, where scrubbing action is provided by a series of spray nozzles. Dirty water and silt from the washer are flumed to concrete settling pits. These are cleaned of accumulated silt about once or twice a week.

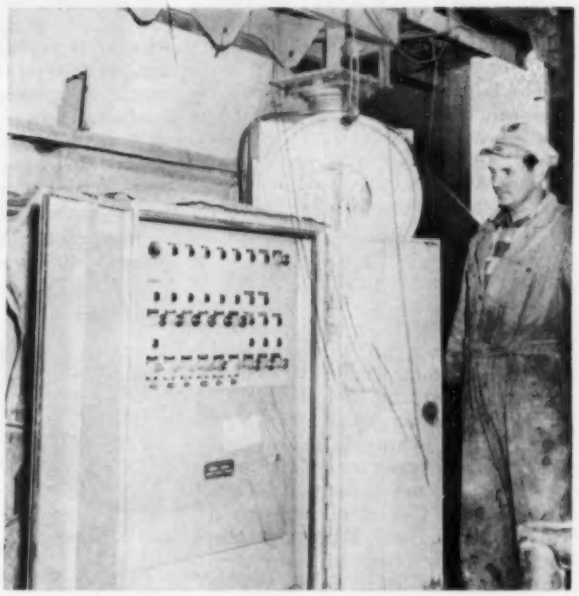
Dried aggregates discharged from the dryer are chuted to the boot of a chain bucket "hot" elevator. A cyclone-type dust collector in the dryer gas exhaust line allows heavier particles to drop out of the stream—and they are then piped to the same elevator.

When they have been raised to the top of the plant, the dried aggregates are discharged on a Symons vibrating screen. This 4- by 12-ft. double-deck unit has a divided top deck with 2- and 1½ in. openings, and a divided lower deck with 1- and ¼-in. openings. The plus 2-in. material is discharged through a tailing chute to a pile at the base of the plant, while the other fractions are chuted to their respective compartments in the batch supply bin under the screen. Each of the four compartments holds 10 tons of material of a particular size.

In the initial step of the batching



The elevator (right) transfers aggregates from the hopper to the 10- by 20-ft. dryer, where they are dried under a temperature of about 300 deg. F.



A view of the upper portion of the control console and one of the scale dials. Behind the cover on the control panel (just below the signal light and control buttons) are the dials with which automatic setting of predetermined batches is made.

G. A. Stroud Sr., left, plant superintendent, has had many years of experience in this type of operation. B. M. Boyd, right, is plant foreman.

process the aggregates from the respective compartments are drawn, in predetermined amounts, under automatic control. The gates below all compartments are actuated by Bellows air cylinders. Materials are discharged into a weighbatcher suspended from one of two Hardy scales. The other scale, and a weigh tank, is used for asphalt.

The latter material, as received by tank-car, may be handled in either of two ways by a 4-in. Kenny asphalt pump. It may be transferred to a pair of storage tanks with 12,000- and 10,000-gal., capacities, or directly to the supply tank on the mixing plant.

With a pumping rate of approximately 5,000 g.p.h., the tank-cars can be emptied in 2 to 2½ hours. Whether it goes directly from tank-car or from storage tank, the asphalt pumped to the plant is discharged into a super-heater tank fitted with steam coils. Steam for this tank is provided at a pressure of 135 p.s.i. by a 150-hp. Lucy boiler that is fired with Bunker C fuel oil through a No. 8 Ray burner. Emerging from the superheater tank at a temperature of 200 to 275 deg. F., the asphalt is transferred to the weigh tank, where it is automatically weighed in accordance with predetermined batch requirements.

In the batching cycle the aggregates are discharged from the weighbatcher into the underlying pugmill and are subjected to a period of dry mixing ranging from 5 to 15 seconds. Asphalt is then supplied to the pugmill, under pressure, through spray bars, and the batches then put through a 45- to 60-second mixing cycle.

A twin-shaft unit, the pugmill has a 5,000-lb. capacity and is driven by a 75-hp. motor. Timed operations have shown that, on the average, there is an interval of only about 75 seconds from the time the aggregates are discharged from the batch supply compartments until the batch is discharged into trucks. In this interval the material passes through the batcher, and is mixed in the pugmill.

While the plant is rated as a 5,000-lb. unit, it has been found more convenient, when supplying a 6-ton truck, to process three individual batches. Discharge gates on the pugmill are also actuated by air cylinders. The complete material flow from feed hopper to pugmill takes approximately 12 minutes.

Separate facilities are provided for handling limestone dust used as mineral filler. Received at the plant in rail hopper cars, this material is discharged into an undertrack hopper, from which it is transferred by a 12-in. screw conveyor to the boot of a bucket elevator. It is raised in the elevator and discharged through a flop gate to a 3-ton storage bin on the asphalt plant, or to a 75-ton mineral filler silo. The same screw and bucket elevator are used in reclaiming from the silo for transfer to the point. A short screw moves the dust from the storage tank on the plant to the weighbatcher.

Under state regulations, each batch loaded into trucks for state highway construction and repair projects must be weighed before it leaves the plant. This is handled on a Fairbanks-Morse 20-ton scale. The operations of the automatic weighing and batching control have been found to be extremely accurate, and therefore, for its own construction projects, the company has not found it necessary to do more than make periodic spot checks of batch weights each day.

Operations of this new facility are carried out by a 4-man crew under the supervision of G. A. Stroud Sr., who has had many years of experience with asphalt plants and production. B. M. Boyd is foreman of the crew, which includes the operator, the car trimmer, and crane operators. Both the construction and asphalt producing operations of Ames & Webb are headed by John M. Bratton, president.

From a control box on the supporting column to the left of the truck cab, a driver may also initiate and complete a batching cycle through remote push-button control.

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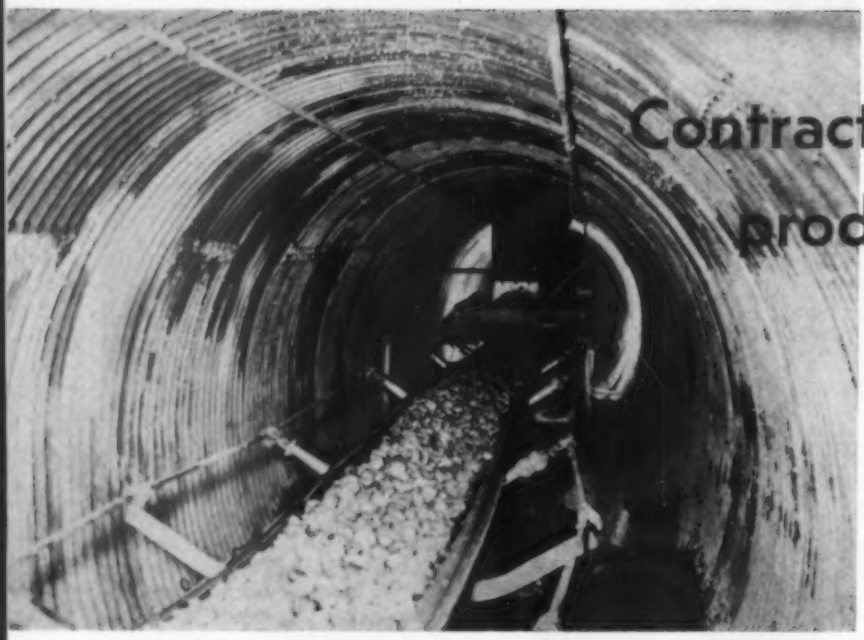


Contractor joins producers' ranks—

A view in the Arcole-Midwest reclaiming tunnel, approximately 300 ft. long, below the finished product stockpiles. Identical to the field conveyor, this tunnel unit transfers reclaimed materials to an outside conveyor on which they are transported to truck-loading bins.

By BUREN C. HEROD

ANOTHER ON THE SPOT REPORT

THE Arcole - Midwest Corp., Chicago, Ill., recently became a member of that group of paving and heavy construction contractors who have established pit or quarry operations as integral phases of their construction activities, and who have thus made themselves partly, or fully, self-sufficient with respect to aggregate supply.

With contracts covering various portions of the Northern Illinois toll highway, currently under construction between Chicago and the Wisconsin-Illinois state line near Rockford, Ill., Arcole-Midwest had previously acquired all needed aggregates from fixed-plant operators in the vicinities of construction sites. A part of the material is still so obtained, but a large tonnage is now being provided by the firm's own new—and its first—sand and gravel plant near Algonquin, Ill., which was placed in operation last summer.

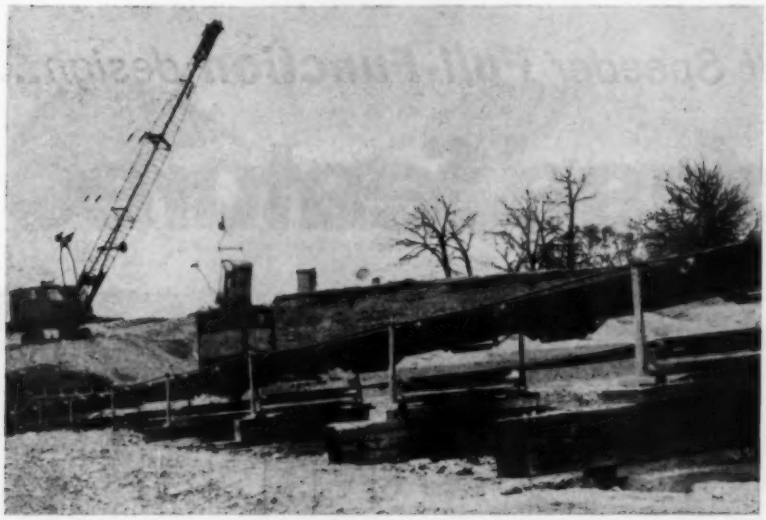
Originally set up as a 150- to 185-t.p.h. facility, the installation was revised and expanded within a few months to achieve its current capacity of up to 400 t.p.h. Located a short distance south of Algonquin and the Fox River valley, the plant was constructed on a purchased 80-acre tract containing a substantial reserve of glacial outwash sand and gravels common to the area. Approximately 50 per cent of the deposit in place is comprised of minus ⅜-in. material.

By means of a flexible design, provision is made for pulling out all fractions separately, as well as for blending any two or all of the finished materials, and the plant produces five primary sizes to meet state specifications for the toll road aggregates. In addition to sands, the specifications cover aggregates within a range of minus 2-in. to 1-in. The entire output is used in the firm's various construction projects, including the toll road contract.

To process the deposit, Arcole-Midwest crews installed a primary crushing and screening plant a secondary screening and scrubbing unit, a sand scalping and classifying installation, and a 300-ft. reclaiming tunnel for recovery of material from finished product stockpiles. The operation also includes a field conveyor installation of a type unique to the aggregates industries. The primary component of the latter is a 300-ft. belt conveyor on which the idlers are suspended from parallel wire ropes anchored by hooking to the supporting framework of the head and tail pulleys. Although this type of equipment is used in many underground coal mines where portability to meet changing headings or working faces, as well as restrictions on rigid conveyors due to variations in floor and roof, are primary factors, this is reported to be the first application in field conveying above ground.

In the pit, which was opened on

new sand and gravel plant opened by Illinois firm



The pit-to-plant field conveying system. From the short truss-type conveyor below the field hopper, pit-run material is transferred to the conveyor, foreground. The latter, with its wire rope suspension and movable idler and roller components, is probably the first installation of its type in the aggregates industries.

the side of a hill adjoining the plant site, the material is recovered by a Bucyrus-Erie 38B dragline, assisted by a Caterpillar tractor. To provide less frequent dragline moves, the tractor 'dozes material on the pit floor to a point within range of the dragline, and also handles removal of the thin top cover.

Equipped with a 2½-cu. yd. Hendrix bucket, the dragline discharges into a steel field hopper mounted above a short section of rigid-frame belt conveyor. The latter in turn, transfers the load to the 36-in. by 300-ft. Ropebelt conveyor mentioned above. The lightweight, tubular supporting stands of this conveyor, which is made by the Industrial Mfg. Division of the Goodman Manufacturing Company, are spaced at intervals of 10 to 20 ft. Grooved caps topping the uprights on each stand hold the wire rope (see accompanying photograph).

The carrying idlers, which can be spotted at any desired point, are hooked to the wire rope. Conventional return idlers are mounted on the crossbars of the rope-supporting stands. According to John A. Holmes, plant superintendent, who has a background in mining as well as construction prior to his present position, this conveying unit has proven readily adaptable to varying terrain and has minimized the need for levelling at its installation. It is planned to accompany pit advance with an extension of the present unit.

At the plant the pit run material is discharged from the field conveyor at an average rate of 350 t.p.h. to a short lateral 30-in. belt conveyor that feeds the primary crushing and screening plant. The latter, a Cedarapids portable unit, mounts a 4-ft. Symons standard cone crusher and a 4- by 10-ft. horizontal primary or scalping screen.

Feed discharged on the single-deck screen is separated to plus and minus 2-in. fractions, the larger passing directly into the cone crusher. Crushed material reduced through a ¾-in. setting is discharged from the crusher to a short 24-in. return belt and is carried back to a point near the discharge end of the field conveyor in closing the primary circuit.

Minus 2-in. throughs from the above screen are transferred *via* a 30-in. belt conveyor to the portable Cedarapids washing plant. The latter is comprised of a 5- by 10-ft. rotary scrubber followed by a 4- by 12-ft. double-deck horizontal vibrating screen. Running gear for both the portable washing plant and the portable primary plant have been removed, and the units have been provided with concrete and/or timber supports and bases.

With a 1-in. opening top deck and a ¼-in. slotted bottom deck, the washing screen separates the minus 2-in. feed from the scrubber into minus 2- by 1- in. and 1-in. by ¼-in. fractions. The former is discharged onto a 24-in. belt, and the latter split laterally to two other belt conveyors—also 24-in. units—these finished materials then being carried up to discharge over respective stockpiles above the reclaiming tunnel.

In contrast to many operations in which the process water supply system has no more capacity than that required to meet normal production needs, this plant has been provided

An overall view of the plant from the pit. In the center are the primary crushing and screening setup and the washing plant. At the right is the sand plant, and at left, the truck-loading bins.

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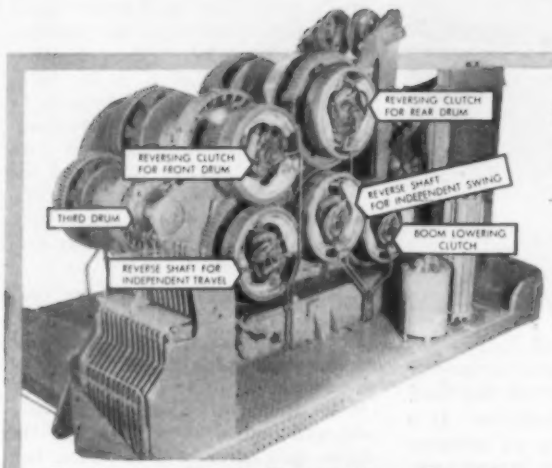
all these features


REVERSING CLUTCH FOR REAR DRUM
REVERSING CLUTCH FOR FRONT DRUM
REVERSE SHAFT FOR INDEPENDENT SWING
THIRD DRUM
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REVERSE SHAFT FOR INDEPENDENT TRAVEL

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• Independent rapid boomhoist	x	x	x		x
• Fully interchangeable, self-adjusting clutches	x				
• Two-speed travel in either direction through gear reduction	x	x			
OPTIONAL FEATURES					
• Reversing clutches for one drum	x	x	x		x
• Reversing clutches for both main drums	x				
• Boom lowering clutch	x			x	x
• Third drum without restricting any other function	x			x	
• Independent swing and travel without restricting any other function	x				
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And that's why *Full-Function* design spreads wear over more clutches, shafts, gears and bearings. Only the power trains in use are under load!

But this is only one of the many Link-Belt Speeder advantages. You also get—

- **Greater usable horsepower**
- **Speed-o-Matic—proven power hydraulic controls**
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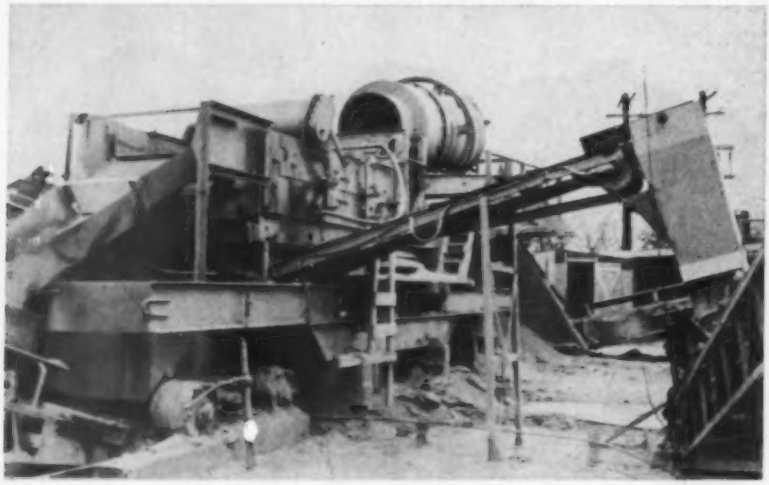
LINK-BELT SPEEDER

It's time to compare . . . with a Link-Belt Speeder

on one shovel-crane

Mounted on concrete piers and timber cribbing, the portable primary plant separates the plus and minus 2-in. fractions. The former is reduced in the crusher through a ¾-in. setting and returned to the screen; the latter continues to the washing plant.



The portable washing plant, with its scrubber and washing screen. Cleaned, sized fractions are individually chuted to separate stockpiling conveyors (left and right).

with a substantial margin beyond that point. Comprised of a 12-in. supply line from the Fox River, and a 200-hp. Allis-Chalmers pump, the system can furnish 200,000 gal. of water per minute.

Bottom-deck throughs from the washing screen are flumed to a sand slurry tank from which they are transferred by an 8-in. Allis-Chalmers sand pump to the sand plant. Here they are fed to a single-deck screen fitted with 8-mesh screencloth. This unit discharges the retained pea gravel to another stockpiling belt conveyor, while the throughs are flumed to an Eagle Iron Works scalping tank.

From the latter, sand is fed to a 36-in. by 25-ft. Eagle twin-screw classifier, and the finished material then discharged to a fifth stockpiling conveyor. Scalping tank overflow is flumed to settling areas with the filtered water passing *via* natural drainage to the Fox River, 2,000 ft. from the plant site.

An unusual and efficient feature has been incorporated in the sand processing. The overflow from the discharge weir of the classifier, in lieu of being flumed to waste, is piped back to the slurry tank. This in effect makes a closed circuit system that includes slurry tank, the sand plant screen, the scalping tank, and the twin-screw classifier. It has made possible a 100 percent retention of the 100-mesh sizes in the flow.

Materials in the finished product stockpiles may be recovered in either of two ways. A Haiss loader is employed in direct loading of trucks from the stockpiles; and for transfer to truck-loading bins, the various products may be drawn individually, or in desired blends, onto the reclaiming belt in the underlying tunnel.

Constructed of corrugated steel culvert pipe, about 6-ft. in diameter, the tunnel houses another Ropebelt conveyor. Materials received on this 30-in. by 300-ft. belt are drawn from the overlying piles through manually-operated draw gates. At the mouth of the tunnel the reclaiming conveyor discharges to a 30-in. by 130-ft. inclined conveyor which supplies a pair of truck-loading bins. The latter have a total capacity of about 400 tons.

All shipments from the plant to jobsites are made by truck with loads

(*Continued on page* 130)

Bottom-deck throughs from the washing plant are pumped to this scalping tank and twin-screw classifier that follows (foreground) for sand processing.

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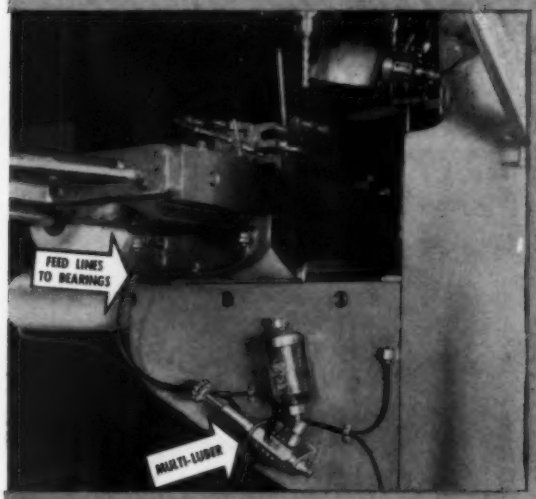

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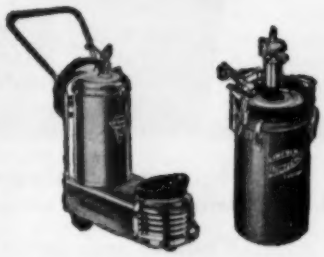

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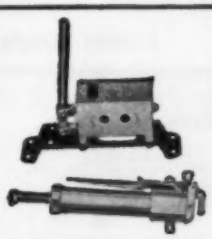

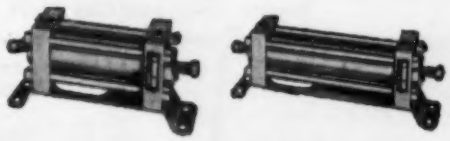

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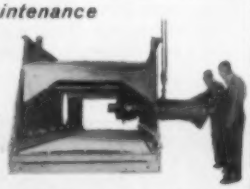

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Enter 120 on card, page 101

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Here are the facts about the

Self-Employed Individuals Retirement Act

By HAROLD J. ASHE

HIGH individual income tax rates on earned income have prevented and continue to prevent the great majority of self-employed taxpayers, including non-corporate quarry owners, from setting aside sufficient money for comfortable retirement. On the other hand, those persons who, by definition, are "employees" are permitted by the Internal Revenue Code to participate in "qualified" profit-sharing trusts or pension plans.

An employer may deduct the cost of current contributions to the plan for an income tax reduction. At the same time, employees do not have any additional current taxable income because of their participation. The result is that employees, including corporate officers, build up two pension programs: company and Social Security.

This income tax concession encourages employers to supplement Social Security benefits of employees. Unfortunately, as of now, there is no comparable encouragement or tax concession for the self-employed to provide for their old age.

This fundamental discrimination against the self-employed would be eliminated with passage of the Self-Employed Individuals' Retirement Act, often referred to as the Jenkins-Keogh Bill. In various amended forms it has been introduced in several successive sessions of Congress, and it will be brought up again in the House of Representatives in 1958. As its basic provisions have become more widely known over the years, its support has grown, including both self-employed individuals and their trade and professional organizations. Supporters range from the American Bar Association, which through its Chicago headquarters is co-ordinating the drive for enactment, to the American Farm Bureau Federation, retailer organizations, wholesaler groups, professional societies, and building contractors' associations.

Proponents of the Jenkins-Keogh Bill point out that Social Security is not an adequate substitute for privately arranged retirement plans. Present and any likely future Social Security benefits are sufficient only to prevent hardship, the present monthly benefit being only $162.80 for insured and spouse. Enactment of the bill into law would, for the first time, afford old-age security for millions of self-employed business and professional men and women. It would be an anti-inflationary measure because it would encourage voluntary savings through retirement trust funds. It would correct a fundamental inequity in the income tax law, giving the self-employed the same rights now enjoyed by employees.

How It Would Work With the passage of the Self-Employed Individuals' Retirement Act, any self-employed person would be permitted, at his option, to exclude from his gross income for income tax purposes a certain amount paid into a bank-trusteed "restricted retirement annuity fund," or toward the purchase of a life insurance company "restricted retirement annuity contract." At retirement age, installment distributions would be made from the fund. At that time, such funds so received would be reported as income, subject to income tax.

Tax Deferment In this connection, note that such funds so deducted for retirement annuity are not tax-free but only tax-*deferred*. However, generally, annuity income under present tax rates and rules might be only partially subject to income tax. The highest tax bracket rate might be expected to be much lower, after retirement, than applicable during the self-employed person's active years in business. Assets set aside for annuities would come off the taxpayer's top layer of income, which is subject to the highest bracket tax applicable to his annual adjusted gross income.

Amount of Retirement Deposits A self-employed individual shall be permitted to deduct for purposes of computing his income tax return 10 percent of his net earnings from *self-employment,* in any taxable year, or $5,000 maximum, whichever is the lesser amount. Example: A quarry owner has $10,000 self-employment income, with $1,000 deductible; another operator has $20,000 self-employment income, with $2,000 deductible. The total amounts deducted for all taxable years during a self-employed individual's lifetime shall not exceed 20 times the maximum annual deduction allowed. This makes $100,000 the maximum ceiling in any case.

Special Rules For Those Over 50 A special rule makes provision for an accelerated build-up of the fund for those over 50. For each year in excess of 50, at the time of enactment of the law, a self-employed person may increase his annual deduction by one-tenth for each year in excess of age 50 and not in excess of age 70. Age is determined as of January 1 of the year the bill becomes law. Thus, a taxpayer starting to partici-

pate at age 55 would be permitted to increase his annual deduction otherwise permissible by 50 percent.

Unused Deductions Unused deductions in any year may be carried over to a subsequent year. Unused deduction is defined as the excess, if any, which could have been deducted over the amount actually deducted and paid into a fund. Such unused deduction shall be an unused deduction carryover for each of the successive five taxable years. The entire amount of the unused deduction carryover for any taxable year shall be carried over to the first succeeding taxable year. If there is still a remaining unused carryover, this can then be applied in succession to each of the other four succeeding taxable years.

The purpose of the foregoing provision is to give the self-employed individual some latitude, particularly at the outset, in availing himself of the maximum deduction privilege. It also recognizes the fact that self-employment income fluctuates sharply from year to year, making it difficult in years of low income to make any deduction, however small. This provision may be invaluable for younger men starting in business. In such cases limited earnings in early years need to be ploughed back; and no margin is provided for a 10 percent investment in a retirement fund.

Retirement Deposit Defined Retirement deposit means payment into a restricted retirement fund or to a life insurance company as premiums under a restricted retirement policy. If any part of the premiums is for the purpose of paying for life insurance protection, such part of the premiums so paid for this purpose is not deductible.

Grace Period A person participating in a retirement program, at his election, may pay into a retirement deposit as late as 4½ months after the close of the taxable year. The amount so paid will be treated as though paid on the last day of the taxable year, and will be deductible in that year's income tax return.

Treasury Department Notification An individual must notify his insurance company of his intention to deduct premiums from gross income. The company, in turn, endorses its contract to that effect and makes an information return to the Treasury Department, reporting the fact. Bank custodians of restricted retirement funds must make a similar information return.

Nonassignable Nature The interest of a person in a restricted retirement fund is nonassignable with certain exceptions. He may (a) designate one or more beneficiaries to succeed to his interest at his death; (b) if a trust plan so provides, he may direct the trustee to transfer his interest into a custodian account or to another trust designated by him which is established as a retirement plan for self-employed individuals; or (c) in the case of a custodian account, if it so provides, he may direct the custodian to transfer his interest to a trust or another custodian account established for self-employed individuals.

Borrowing If any part of the cash value of a restricted retirement policy is borrowed by the insured, the amount so borrowed must be deemed as having been paid to the insured in the year it is received. There is an exception in which the above rule does not apply: borrowing may be solely for the purpose of paying a premium thereon. If the amount so borrowed does not exceed the amount of one annual premium, it is exempt from the "paid" rule, if the loan or advance is repaid in full within 12 months following the due date of the premium so paid.

Premature Distribution A penalty is assessed for distribution made to a self-employed individual prior to his reaching age 65. The tax attributable to the amount included in gross income shall be 110 percent of the aggregate amount of the taxes which would have been payable, had this amount been included in the self-employed individual's gross income. This is ratably spread over the taxable and the four immediately preceding taxable years. If a retirement deposits program has been in effect for less than five years at the time of such premature distribution, the distribution shall be pro rated among those years.

Both authors of the bill, Congressmen Jenkins and Keogh, expect the bill to come up for action again in 1958. The House Ways and Means Committee has scheduled hearings for 1958. Self-employed individuals who would welcome passage of the bill should write the committee, as well as to their congressman, urging passage of HR 9 and 10.

Patents

(*From page* 109)

application for a patent, but he may delay 6 months or so filing an application if he constructs a device which will operate and have two or more persons witness its operation. In the United States the owner of an invention, and the one who has a legal right to the patent, is the person who was first to invent it and make the invention operate.

Of coure, if an inventor obtains a patent having broad claims, he has a valuable form of monopoly. This is so because for the life of the patent the patentee has the exclusive right to make, sell, and use his invention for the term of years specified in the patent grant, generally 17 years. Also, any person is liable for infringement if he unintentionally uses or sells a patented invention obtained from one who does not own the patent or have a license. In other words, innocence is not a good excuse for making, selling, or using a patented device without authority from the owner of the patent.

Various courts have held that a person or a company infringing a patent is liable to a patentee in an amount equal to all profits earned, plus any and all damages which may have been sustained by the patentee. Moreover, if the infringement is intentional and willful, the damage allowable may be three times the actual damages.

Grounds for Infringement A corporation or any person is liable for infringement of a patent under any of the following conditions: (1) if he uses it; (2) if he makes it for his own use; (3) if he purchases a part and combines it with other parts, which comprises an infringing device; (4) if he conspires purposely or unintentionally with another and contributes in any manner to an infringement; (5) if he purchases and resells an infringing device, although the purchase is made believing the one from whom the purchase was made had a license from the patentee to sell or use the device; (6) if he repairs a worn-out part.

Modern courts hold that officers, directors, managers, and agents of a corporation are personally responsible to the patentee for infringement.

Material Service

(From page 80)

mills. Exhausters and mills are driven by 125-hp. motors, and the pulverized fuel enters the kiln firing hoods through 10-in. burner pipes. Shale is drawn from desired bins to 20-in. Schaffer poidometers (one under each bin gate) that delivers any fraction of pre-sized dried shale, or blends, to the kiln feed conveyors at the rate of up to 25 t.p.h. Conveyors No. 19 and 29 (identical) transport the feed up to a pair of shaker feeders. Designed by Meissner Engineers, the 24-in. shakers are mounted on a 10-degree slope, and deliver the feed into the kilns.

Both kilns, manufactured by Allis-Chalmers, are 11 ft. 3 in. by 160 ft. and are driven at 2 r.p.m. by 75-hp. motors through Falk speed reducers. They are pitched to a slope of 11/16 in. to 12 in., and each rides on two tires. Auxiliary drive is available from Buda gasoline engines. Both units are lined with Harbison-Walker fire brick, and have castable refractory of the same manufacture at the feed ends (back housings). G. P. Reintje suspended brick arches are also installed in the latter.

Due to the nature of the feed, kiln operating conditions are necessarily variable, and are adjusted as they would be in any closely controlled burning operation to the characteristics of the material being processed. While kiln operating temperatures approximate 2,000 deg. F., this may be varied, and a kiln speed range of 30 to 135 r.p.h. is possible.

Kiln operation is highly instrumented, and includes kiln hood and exhaust temperature indicators, r.p.m. indicators for kilns and coolers, draft gauges, coal mill (fuel) instruments, and oxygen analyzers. A large part of the instruments and recorders on the Allis-Chalmers control panel are Minneapolis-Honeywell and Bailey equipment.

From the kilns the expanded aggregate is discharged into underlying rotary coolers. Each of these units is driven by a 50-hp. motor through a Falk speed reducer, has a slope of ⅜ in. per 12 in. of length, and is fitted with lifters that allow the material to cascade and be cooled in the induced draft for the respective kiln. Both coolers discharge to conveyor No. 21, which is fitted with a heat-resistant belt.

In each kiln circuit, a Buffalo Forge No. 15 induced-draft fan providing flow of 115,000 c.f.m. at 5.4 in. S.P. draws kiln gases through a Buell cyclone dust collector. A tempering damper in the kiln exhaust ducts protects the fans and collectors from temperatures exceeding 600 deg. F. The two collectors have two groups of six cyclones each to which the respective kiln exhaust is split by pants-leg ducts. Dust collected in these units is discharged through airlocks to 9-in. screw conveyors, and then transported to conveyor No. 21 to join the cooler discharge. From the latter conveyor, the expanded product is discharged in a transfer house to No. 21A and is then taken to finished-material-handling facilities.

A view of the two 160-ft. kilns from the firing building. As future markets may warrant, the area to the right (north) of the present units is available for the installation of additional kilns.

Expanded Shale Although, as pointed out earlier, operations were designed to provide a presized kiln feed with the subsequent expanded, coated aggregates available as finished products, the following flow incorporates phases that provide for further screening and/or crushing whenever desired.

Inclined conveyor No. 21A enters the top of the expanded shale crushing and screening building, from which two totally enclosed stockpiling conveyor galleries emanate. The building houses a pair of 6- by 14-ft. triple-deck Ripl-Flo vibrating screens and a Nordberg Symons 4-ft. short head cone crusher. From top to bottom the three decks on each screen have, respectively, ½- by 4-in., ⅜- by 4-in., and 4-mesh by 3-in. slotted openings.

Any material agglomerated in the kilns is retained on the top deck and chuted to the cone crusher. For additional product size flexibility, the fraction retained on the middle decks may also be chuted to the recrushing operation, or it may be sent through another flop gate and chute to one of the three stockpiling belts. Aggregates retained on the lower decks also have alternative routes—in one they are chuted to blend with the middle-deck fraction ahead of stockpiling, and in the other they are separately chuted to a second stockpiling conveyor. Bottom-deck throughs are chuted to a third belt. Cone crusher discharge is taken on return conveyor No. 28 to No. 21A in closing the crusher circuit.

Conveyor No. 22 transfers the fine aggregate from the screens through one of the galleries to discharge on an underlying outside storage pile, while No. 23 and 24, transporting medium and coarse products, respectively, are housed in the other gallery. All three are equipped with Link-Belt trippers, from which the various materials are distributed on lineal piles.

Below the stockpiles, which accommodate a total of about 20,000 tons, are two reclaiming tunnels—one for recovery of the coarse and medium fractions, and a second (on the other side) for the fine material. At the base of the tower, these two tunnels join a third, through which aggregates are transferred to a barge-loading dock.

Materials drawn through drop gates from the coarse or medium piles are transported to a transfer point from which they may be sent on any one of three flow lines—to rail and truck loading point, to the dock, or to recrushing for additional finer sizes. In the first, reclaiming tunnel conveyor No. 25

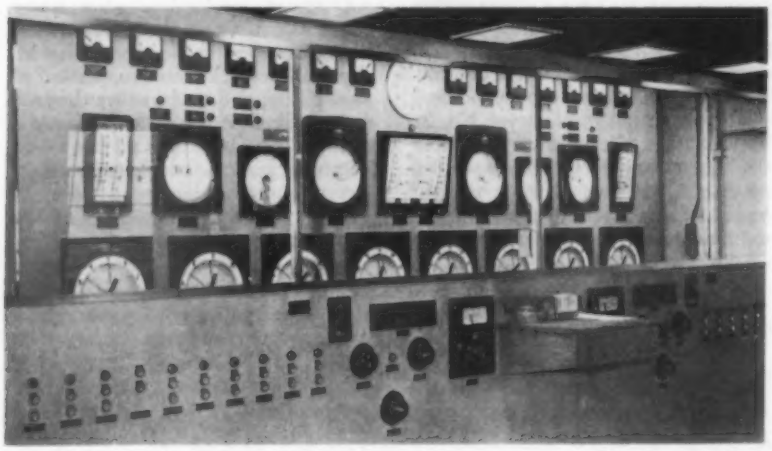
discharges to No. 27, and the aggregates are carried up to a flop gate over chutes leading to the rail siding and to a 125-ton capacity Butler truck-loading bin. For barge loading, the tunnel belt (No. 25) discharges to No. 27A—housed in the tunnel leading to the dock—and the latter discharges to a swiveling boom conveyor, from which the materials are distributed on barges. In the recrushing circuit, the large aggregates are discharged from the reclaiming belt to conveyor No. 28, and are then transferred to 21A, on which they are returned to the screening-crushing circuit in the tower.

On the opposite side, conveyor No. 26 in the tunnel below the fine material stockpile may also feed any of the three flows described above, although the recrushing in this case will probably be rarely used. The system is available, however, in the event coarser products are ever stockpiled from the gallery above that side.

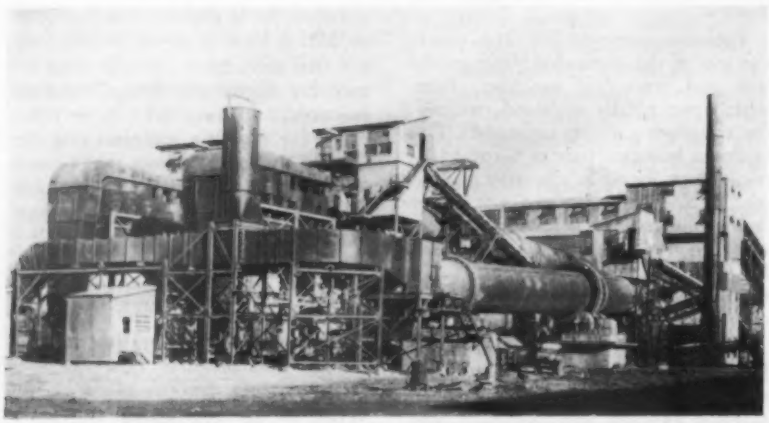
In order to control dust at such points as the feed and discharge to and from the main crushers, as well as at several conveyor transfer points, a Johnson-March type RM liquid dust-control system has been installed.

With the three methods of making shipments, the plant serves customers within a radius of 200 miles. It is excellently located with respect to the active belt of industry and construction that follows the shore of Lake Michigan from the Milwaukee, Wis., area, through the metropolitan Chicago area, and well into Indiana.

Product Specifications Among the properties important to those customers engaged in the design and use of lightweight concrete are weight, durability, workability, and strength without excessive cost. The results of tests on concrete and specimens made with Materialite show desired qualities to be present to an exceptional degree.



The totally enclosed panel of indicating and recording instruments on the kiln firing floor. Along the front, outside, are the control buttons for various units in the expanding flow.



Each of the two dust collectors, seen here behind the fan duct, has two banks of cyclones each. At the lower right is one of the two kiln induced-draft fans.

With respect to the aggregate itself, investigations showed the following interesting points:

Durability (ASTM C88, 5 cycles) weighted average loss, minus ¾-in. 0.75%

Absorption (24 hours)

	% by weight
¾ by ⅜ in.	7.5
⅜ in. by No. 4	7.0
No. 4—No. 16	6.5
No. 16—No. 50	2.8
Minus No. 4 (graded)	4.8

Unit weight lb./cu. ft.

	loose	rodded
¾ by ⅜ in.	34.2	38.1
⅜ in. by No. 4	38.5	39.1
No. 4—No. 16	46.3	48.5
No. 16—No. 50	56.5	6.17
No. 50—No. 100	48.8	55.2
Minus No. 100	55.2	63.1

L. A. abrasion (ASTM C131 grading B) percentage of wear 34.64

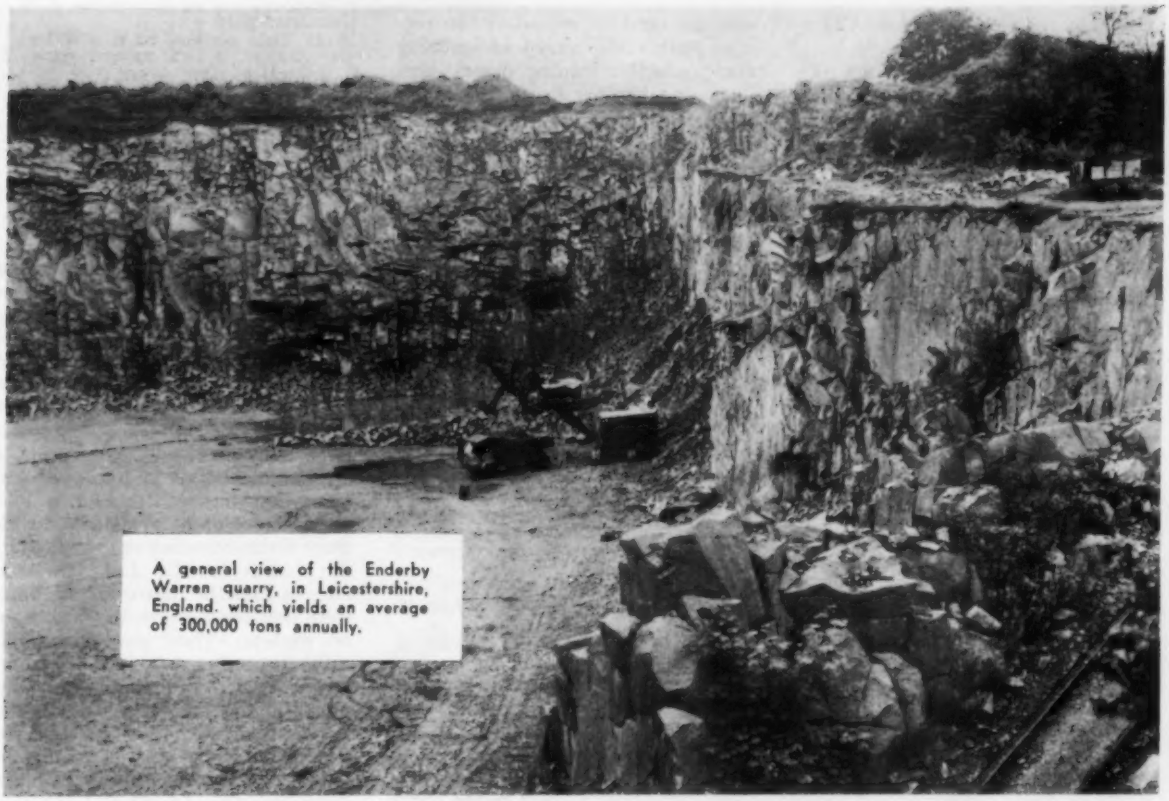
Crushing strength

1-in. compaction	2,260 p.s.i.
2-in. compaction	17,700 p.s.i.

For use in concrete test mixtures, the aggregates were screened and recombined into definite gradations. Mixes were made with 4, 5½, and 7 bags per cu. yd., and with 2½- and 5-in. slumps. Results indicated that compressive strengths of at least 3,000 p.s.i. at 28 days can be expected with a 5-bag mix. The modulus of elasticity measurements closely paralleled those found in the Housing and Home Finance Agency report on *Lightweight Aggregate Concretes* (published August, 1949) in which the results of a comprehensive study of a wide variety of lightweight aggregates and concretes were published. Values on concrete using Materialite were from one-half to one-third lower than the modulus usually obtained with heavy aggregate concrete.

With respect to the strength-weight ratio, Materialite concrete was as good as or better than the high-strength concretes described in the HHFA report. High drying shrinkage was not in evidence, nor was there any visible deleterious effect after 15 cycles of wetting and drying. An excellent durability was shown in the results of 100 cycles of freezing and thawing, which failed to produce a decrease in sonic modulus of elasticity or loss in weight.

The outstanding new installation in which these high-grade aggregates are produced is operated by a crew of 60 men, on a round-the-clock basis, under the direction of David Lewis, plant manager, and Douglas Kirp, plant superintendent. George Kirp is the firm's vice-president in charge of production, and Charles Goodman is the Materialite product manager.



A general view of the Enderby Warren quarry, in Leicestershire, England. which yields an average of 300,000 tons annually.

New British Crushed Stone Plant

By J. GRINDROD

ANOTHER P&D EXCLUSIVE

IN ORDER to achieve increased and regularly maintained output of all required sizes of dry stone and to step up productivity approximately threefold so as to make it comparable with American standards, the Enderby and Stoney Stanton Granite Company Limited, one of the Mountsorrel Granite Group of companies, has recently carried out a reorganization of face working at its Enderby Warren Quarry, Leicestershire, England, and has installed a new crushing-and-screening plant at a cost of about £300,000.

With a conservatively rated throughput of 150 t.p.h. the new in-line plant was first put into operation in August, 1956, after ten months of construction, and was officially inaugurated in September, 1957. Its average output of 300,000 tons per year is nearly three times that previously achieved. This production will help to meet the greatly increased demand for Enderby stone aggregates.

Enderby granite creates problems in drilling, blasting operations

Enderby stone's fine-grained structure gives it characteristics of hardness and toughness. It is a pink, green-speckled quartz-diorite-porphyrite composed of hypantomorphic crystals of oligoclase andesine feldspar up to 3 mm. long (averaging about 1 mm.), pale green hornblende, interstitial quartz, and abundant epidote. Sphene and some fibrous prehnite are also present, and the feldspars have been partially re-

placed by sericite and epidote. Chlorite is a major constituent.

Physical characteristics of the rock include the following: specific gravity 2.75; dry attrition 1.81; wet attrition 1.94; abrasion 19; impact 25; crushing strength 45,000 p.s.i.; aggregate crushing 11.3; French coefficient of wear 26.8; aggregate impact 12.0.

Enderby stone possesses excellent qualities for use as aggregates, in road construction work, as railway ballast, and as a filter medium in sewage works. Its toughness, however, makes it difficult to quarry and gives rise to abrasion problems.

Whereas, before reorganization, there was no set pattern of drilling, the 2½-in. diameter holes being sunk by the quarrymen to take advantage of jointing and to bring down as much rock as possible, regardless of size, a pre-planned system of drilling is now employed. Vertical holes, 4 in. in diameter, are now arranged so as to provide adequate quantities of sufficiently fragmented rock at all times and to reduce as much as possible the need for secondary blasting. This system also aimed at lessening non-productive loading shovel time, increasing dumper loads, and eliminating primary crusher blockage.

Hitherto, a primary yield of 8.1 tons per lb. of explosive was obtained, with an overall yield of 6.0 tons. Now, the yield ratio is about 3 tons of rock per lb. of explosive. Details of a typical blast used at Enderby Warren to produce rock of desired fragmentation are as follows:

Face depth—
80 ft. and 70 ft.
Hole depth (4-in. dia.)—
23 at 80 ft.
3 at 70 ft.
Drilling pattern—
26 holes in one row
Burden 12 ft.
Spacing 12 ft.
Delay sequence—
Detonating relays in Cordtex fuses giving 17-ms. interval between holes, or total delay 0-425 ms., detonated from one end.
Explosives—

3¼-in. Opencast Gelignite	7,200 lb.
⅞-in. A.G.D. (due to two ragged holes)	400 lb.
Total charge	7,600 lb.

Calculated yield—
(a) Yield per hole 80 ft. - 860 t.
70 ft. - 750 t.
(b) Total yield 22,000 t.
(c) Yield ratio 2.9 t./lb.
Final result of blast—
No. of pop shots 660
No. of stump shots 26
Total yield 22,700 t.
Initial yield ratio 3.0 t./lb.
Overall yield ratio 2.95 t./lb.
Pop shot ratio 1/s. 34.3 t.
Primary yield per ft. drilled 11.0 t.

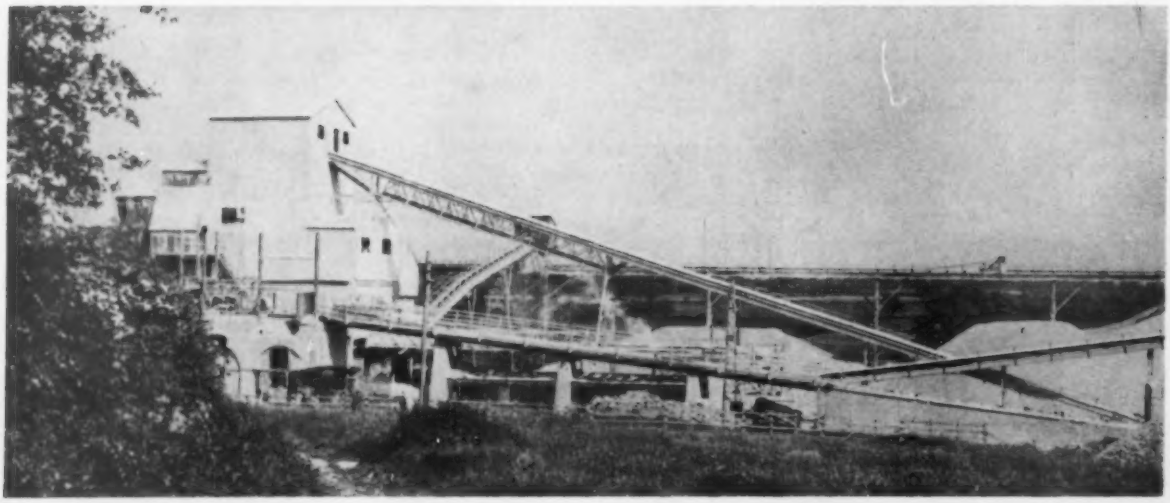
It will be seen that an average of one pop shot to every 34 or 35 tons loaded at the face has now been achieved, compared with about one shot for every 2 tons loaded in the old days; but this increase has been attained by the use of a larger excavator (2½-cu. yd. capacity) and a larger (60-in. by 48-in.) primary crusher, as well as by improved primary breaking techniques.

Primary drilling is carried out with three Halco-Stenuick rigs supplied by the Halifax Tool Co. Ltd. It was, in fact, at Enderby that these machines were used for the first time in Britain on granite. They give an overall drilling speed of 4 ft. 9 in. per hour, inclusive of moving and setting up time. The greatest depth of drilling required so far has been 85 ft. Equipped with HS 50 hammers, these rigs have been found to give an average bit life of 430 ft., with the maximum of 540 ft. It has been found most economical to regrind every 18 ft.

Overburden at Enderby Warren averages a thickness of 8 ft., increasing to the maximum of about 15 ft. at the edge of the present working area. This material is stripped off as a continuous operation by a 1-cu. yd. Ruston-Bucyrus 32-RB shovel powered by a 90-hp. Ruston and Hornsby oil engine working in conjunction with a Caterpillar D7 bulldozer.

Left: Here a 2½-cu. yd. electric shovel is loading granite into a 15-ton haulage dumper at the quarry.

Below: The screenhouse at Enderby, with stockpiles in the background.



Few residual toes are created at the now vertical quarry face. A Holman wagon drill equipped with an SL 16A drifter of 4-in. bore and 3 7/16-in. stroke is used for any stump shots that are needed. Forging the threads on the rods of these drills instead of screw cutting them, has greatly reduced breakage.

Holes for the now much less frequent pop-shots are drilled with Holman SL 9 hand drills. Connecting a number of shots with "fast" igniter cord initiated by a length of safety fuse reduces the number of fuses to be lit to the minimum. This procedure is much less laborious and also much safer.

Supplying all the rock drills at the face with compressed air at a working pressure averaging 80 p.s.i., is a 4-in. ring main fed from a bank of three Holman T 60S two-stage reciprocating stationary compressor sets.

An electrically-powered 2½-cu. yd. Ransomes and Rapier model 490 shovel is responsible for most of the loading work at the quarry and this is backed up by a 1½-cu. yd. Ruston-Bucyrus electric 37-RB, which has been in service for a number of years. A third 37-RB (diesel-powered) brings the total shovel capacity at the quarry up to 5½-cu. yd. Since this is more than is required for maintaining the stone supply, the latter machine is employed chiefly on development work.

For haulage at the Enderby Warren Quarry five vehicles are available, four being in use at any given time while the fifth is being serviced. The two most recently acquired vehicles are Foden FGD/6 six-wheel dumpers with 10½-cu. yd. capacity bodies and maximum pay load of 15 tons. A.E.C. Matador tractors converted to quarry use give an average load of 10 tons. The distance from the present quarry face to the plant averages 400 yd.

Present daily production at the quarry averages 1,200 tons in one 8-hour shift by 16 men, comprising a foreman and three primary drillers, four excavator operators, five dumper drivers, two shot firers (who also do the secondary drilling), and one bulldozer operator.

Designed and specified by the quarry management and largely based on American and Belgian practice, the new 150-t.p.h. crushing-and-screening plant at Enderby entirely supersedes the old plant, apart from stockpiling and reclaiming arrangements for the finished products and one line of classifying screens. It has been designed so as to be sufficiently flexible readily to meet changing demands in the sizes of the finished products and to permit as nearly automatic operation as possible.

The tertiary crusher building, with the minus 3-in. plus ⅜-in. surge pile in the foreground.

Richard Sutcliffe Limited, of Wakefield, Yorks, the main contractors, by careful planning and precise scheduling of each individual construction operation, completed the plant in ten months from the start of site preparations.

Comprising primary, secondary, and tertiary crushing operations, the new Enderby plant at present produces about 24,000 tons of stone monthly, about 94 percent of which is in the minus ¾-in. sizes. In order to achieve as nearly automatic operation as possible without risking a pile-up due to stoppage of any item of the plant, the electrical control of the individual motors is arranged in two sequences: one from the classifying screens back to the feeders supplying the chipping crushers, and the other from the scalping screen in the tertiary house back to the primary crusher feeder. The crushers are not incorporated in this sequence control. Except in extreme emergency, they should be empty when stopped, and so are left running continuously.

At the 60-in. by 48-in. double-toggle action sledging breaker type Hadfield primary crusher, the run of quarry rock is dumped into a 30-ton rectangular hopper and fed by a 60-in. plate feeder, fitted with manganese steel flights, over inclined grizzly bars which screen out the minus 3-in. stone and pass the rest into the crusher. Provision has also been made for a ½-in. dirt extraction screen; and the minus 3-in. plus ½-in. fraction by-passes the primary crusher, but merges with its product for subsequent treatment.

The 124-ton primary crusher, driven by a 250-hp. motor, is one of the largest working on granite in the United Kingdom. Although at its present setting of 7 in. it is rated at 220 t.p.h., up to 300 t.p.h. has, in fact, been comfortably put through the machine. To achieve best results with the minimum of wear and tear from the tough material handled, modified manganese-chromium steel liners have been fitted. These, with larger clearances and periodic relief stresses through cutting channels between liner sections, proved satisfactory in operation with a reduced crushing stroke of 1.2 in. The swing stock had to be modified and the stationary stock built up to compensate for the manganese-chromium steel liners.

From the primary crusher the minus 10-in. nominal size stone is passed by 36-f.p.m. plate feeder onto a 100-ft. long, 42-in. wide conveyor belt equipped with a continuous belt weigher and recorder and a tramp metal detection unit, which delivers to the secondary crusher. The plate feeder is, however, to be replaced by an oscillating feeder running at 500 r.p.m.

The conveyor is driven by a 15-hp. motor at 185 f.p.m., the belt tension being maintained by a gravity take-up. If metal is discovered on the primary to secondary crusher belt line by the search coil of the HD9 electronic metal detector, the conveyor belt and feed to the crusher are automatically stopped until the metal has been removed and the detector reset. Special Comet stainless steel fasteners and hinge pins are used in the joining of sections of this conveyor belt.

Fitted with an extra-coarse bowl

and driven by a 300-hp. motor, the Nordberg Symons secondary cone crusher has a rated capacity, at a setting of 1½ in., of 300 t.p.h. of minus 4 in. size product. It has a feed opening of 13½ in., the feed being automatically cut off by a searching switch above the feed box in the event of a choke. With the intermittent feed of granite at this crusher, wear is exceptionally heavy, some 10 in. of manganese steel having been abraded during the first seven months of operation.

From the secondary crushing house the material is taken by an 80-ft. long, 30-in. wide, 360-f.p.m. conveyor belt to the top of one end of the tertiary building. Here the stone is fed onto a 60- by 160-in. type Q10 Niagara four-deck vibrating scalping screen with 4-, 3-, ⅞-, and ⅜-in. openings. Although only three products are generally made, two of the decks acting as relievers, provision has been made to obtain minus 4-in. plus 3-in. size if required.

While minus 3-in. plus ⅜-in. product is taken by a 30-in. inclined conveyor to a 90-ton capacity rectangular hopper which acts as a surge bin for the tertiary crushers, the plus 3-in. material, which amounts to between 30 and 40 percent of the feed, is recirculated to the secondary crusher and the minus ⅜-in. material goes to the screenhouse.

In addition to the minus 2-in. plus ⅜-in. material held in the tertiary surge bin, this size of stone can also be stockpiled to the extent of 3,000 tons or more, 30-in. belts being used both for delivery to the stockpile and tunnel reclaiming. This stockpile serves to balance quarry production with screenhouse demand. Automatic Tektor level control equipment is used in the surge bin.

Stone from the surge bin can be delivered to each of three Nordberg Symons cone crushers mounted in line in the tertiary house. These units are a 3-ft. standard final bowl crusher powered by a 90-hp. motor, a 4-ft. standard fine bowl machine powered by a 125-hp. motor, and a 4-ft. short head crusher with a coarse bowl driven by a 150-hp. motor, the latter dealing chiefly with recirculated material from the screenhouse. To make ¾-in. down stone, the settings of the machines are ½ in., ⅜ in., and $\frac{3}{16}$ in.

Providing continuous maximum feed at the tertiary crushers and thereby reducing abrasion of the manganese steel liners to such an extent that, with increased throughput, replacement is necessary only every ten months, are two Sherwen electromagnetic feeders, one a 30-in. and the other a 24-in. unit.

Linking up with the minus ⅜-in. stone from the scalping screen, the tertiary crusher product is taken by two conveyor belts a distance of 200 ft. to the top of the screenhouse, where the stone coarser than ⅜ in. is screened both for size and shape. Flat or flaky stone is returned to the tertiary crusher for re-treatment. The screens used here consist of one double-deck 10-ft. by 4-ft. Niagara D8A, which screens to over and under ¾ in.; two Enderby-designed and built 5-ft. by 4-ft. double-deck screens which deal with the plus ¾-in. material from which rejects and 1-in., 1½-in., and 2-in. material in both cubical and flat stone are binned; one 13-ft. by 5-ft. three-deck Niagara TR 10 vibrating screen which handles the minus ¾-in. line and with a square mesh produces minus ⅛-in. to dust, ¼-in. and ⅜-in. stone; two Enderby screens, 7 ft. by 4 ft. and 6 ft. by 4 ft. respectively, which are fitted with square mesh on the top deck and slots on the lower deck to produce ½-in. and ¾-in. sizes in both cubical and flat stone and salable ⅞-in. stone from the rejects of the top deck of the Niagara TR 10.

Under the various storage bins which are fed from the screens and which have a total capacity of about 600 tons, there are four 24-in. conveyor belts and chutes for loading road and rail transport. One of these belts takes rejects and flaky stone back to the tertiary crusher; two deliver to a further belt which supplies a nearby macadamizing plant owned and operated by another of the Mountsorrel group of companies (with which Enderby is associated); and a fourth belt delivers to the 40,000-ton capacity stockpile area where the finished products in the various sizes are stored by an overhead system equipped with tripping gear. Reclamation from the stockpiles is *via* an underground concrete-lined tunnel housing two collection conveyors. The Enderby plant is operated by eight men, plus the maintenance and service staff.

The writer is indebted to the management of the Enderby and Stoney Stanton Granite Company and Richard Sutcliffe Limited for their assistance in preparing this article and to the editor of the British journal *Mine and Quarry Engineering* for permission to use material published in this journal on the occasion of the official opening of the new Enderby plant.

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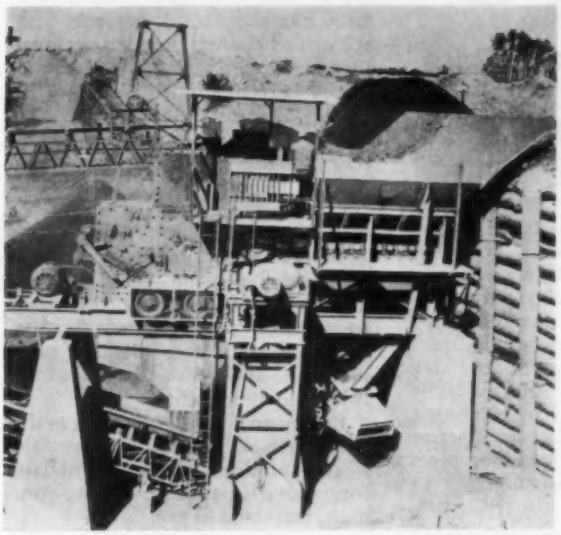


A side view of the crusher and feeder at the Mullet Coal Company's operation, Mount Eaton, Ohio. The crusher has a rotor-to-rotor drive.

THE Mullet Coal Company's strip-mining operation at Mount Eaton, Ohio, which was formerly used for producing industrial coal, now includes the production of concrete aggregates.

Operation Expansion took place last summer with the addition of a new crushing and screening plant, designed and installed by Aggregates Equipment, Inc., Lancaster, Pa. The project was undertaken to make use of the limestone mined simultaneously with the coal.

Over the coal is a 4-ft. layer of limestone, which is revealed after the removal of overburden. This stone is first cleaned off with a tractor and broom, then drilled and blasted. Between the limestone and the coal is an intermediate layer of clay, dirt, and mud, which mixes with the limestone when it is shot, forming a mixture which contains as much as 30 percent of objectionable fines.

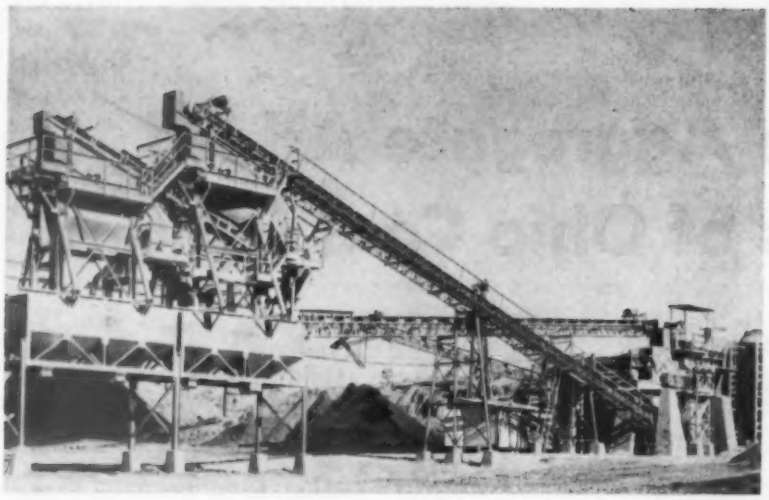
Prior to this recent change in the firm's operations, the overburden (including the limestone ledge) had been placed in spoil banks—a necessary method but one on which there was no return to offset the cost. After some studying, Atlee Mullet, company president, found that through a revision in drilling the stone could be processed into aggregates for the local construction market. He calculated that 180 blast holes, averaging 4 ft. in depth, would be required to recover 1,200 tons of broken stone daily—a quantity on which a suitable profit could be realized.

On the basis of results in a field test, a Worthington self-propelled Port-A-Trac wagon drill was installed in the pit operation. With a 1¾-in. bit on 8-ft. drill steel, and powered by a Worthington Blue Brute portable compressor, the new drill has put down 240 holes or 960 ft. on one 8-hour shift.

Quarry material is shovel-loaded and trucked about ½ mile to the crushing and screening plant. The bulk of the 2-in. and under material containing the unwanted dirt and fines, is efficiently scalped off ahead of the crusher by a Universal Wobbler Feeder and reject conveyor. The plant is handling material at the rate of 200 t.p.h.

The feeder, a 9-in. pitch unit, has 16 elliptical-shaped bars composing a bed 36-in. wide at the bottom of a loading hopper. Wobbler bars are fixed at 90 degrees to each other to scalp and feed by agitating the load as the bars turn. Oversize is simultaneously fed into a Universal 3645 Impact Master, which functions as

Atlee Mullet, left, president of the firm, observing blasthole drilling with the new self-propelled drill and portable compressor.



The screening tower at the left features a blending chute arrangement for a dual screen setup. Flop gates and control levers enable the operator to produce specification material without changing wire cloth.

a primary and secondary crusher by closed-circuiting with a screening tower. There a blending chute arrangement permits production of specification material without changing the screen cloth.

The crusher has a rotor-to-rotor drive and is driven by two motors—a 100-hp. and a 75-hp.—both totally enclosed, fan-cooled units. The feeder is driven by a 15-hp. U. S. Vari-Drive.

New Color Film Available On Cement-Making Process

The latest contribution to better understanding of the cement industry is *A Penny a Pound*, a new color motion picture which describes the cement-making process. The film was sponsored by Calaveras Cement Company, San Francisco, Calif.

Several hundred of the company's employees and their families previewed the film at two special theater showings in San Andreas. The 20-minute-long sound movie begins with a 100,000-ton blast in a quarry and follows the cement making process to the finished product and its ultimate use.

A cement plant is planned for Caldera, south of Puntarenas, Costa Rica, to be sponsored by private individuals, the Instituto Nacional de Vivienda y Urbanismo, and the Ferrocarril Electrico al Pacifico. These are autonomous government institutions. Limestone deposits at Guanacaste would probably be used.

Gypsum, Gypsum Products Up Slightly in 3rd Qtr., 1957

Domestic mine production of crude gypsum during the third quarter of 1957, as reported to the U. S. Bureau of Mines, totaled 2,509,345 short tons, an increase of only 12,156 tons over the corresponding period of 1956. Imports of crude gypsum increased 7 percent, and brought the total apparent supply up 3 percent from the 1956 third quarter.

Output of calcined gypsum totaled 2,130,100 tons, up 1 percent; and uncalcined gypsum products declined 13 percent, primarily as a result of the 14 percent drop in demand for cement retarder. Agricultural gypsum and gypsum for filler and unclassified uses declined 10 and 13 percent, respectively.

Although output of pottery, plateglass, and terra-cotta plasters declined, industrial plasters as a whole increased 2 percent. Building plasters were down 7 percent. Increases were noted for prepared finishes, roof-deck, and "other" building plasters, but all other types declined from 6 to 49 percent.

Led by an 8 percent increase in the production of wallboard, all prefabricated products, except formboard for poured-in-place gypsum roof deck, increased in use.

The American Foundrymen's Society has awarded a citation to THOMAS E. BARLOW, sales manager, eastern clay products department, Industrial Minerals Division, of International Minerals & Chemical Corporation, Chicago, Ill. He received the citation for service to the Society and its chapters as a speaker on molding sands and cupola operations.

• At the Stockport Sand and Gravel Company's operation near Stockport, Ohio, this LeTourneau-Westinghouse D Tournapull scraper is used to supply gravel to a dragline. Starting at the top of a pit, the scraper loads downhill (an incline of about 60 percent). The material is spread in front of a dragline bucket on a cable (left), which picks it up and carries it to a conveyor belt leading to the hopper for crushing and processing.

Arcole-Midwest

(*From page* 118)

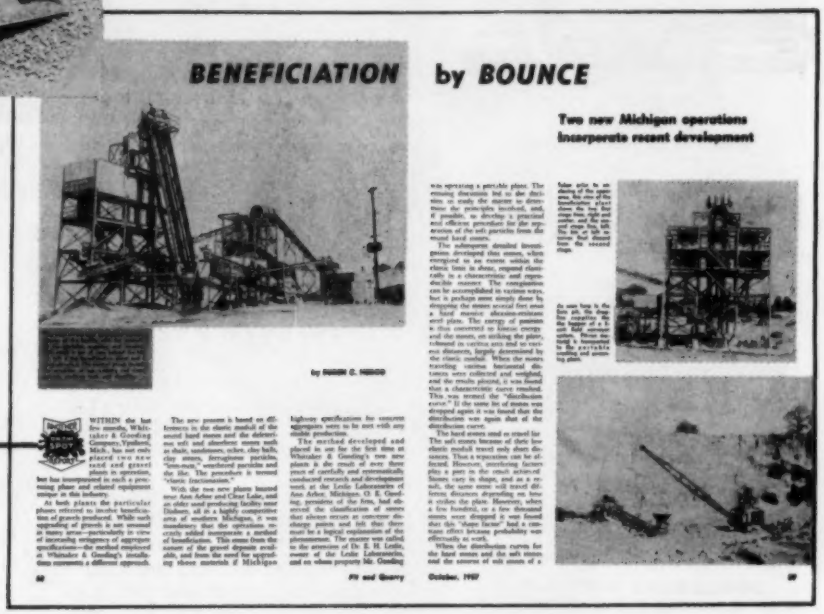
weighed out over a 50-ton Howe truck scale. In addition to those products noted above, crushed pit run material may also be loaded from the transfer point between the washing plant and its feed belt from the primary plant. A hopper at this point supplies a portable Kolman loading conveyor from which trucks may be loaded.

Under the supervision of Mr. Holmes, the plant is operated on 10-hour daily shifts, 6 days a week, with a crew of 15 men. It was set up to supply the firm's own needs on the toll road and other construction contracts, and it is estimated that virtually the entire output will be so used.

Picture of an Editor building Editorial Quality Out in the Field

Buren C. ("Sandy") Herod, a PIT AND QUARRY Field Editor, in boots, overalls and hard hat, getting facts and pictures for the on-the-spot editorial feature shown at the right. "Sandy" is a graduate geologist with field experience in mining, explorations, plant construction and operations.

Symbol of Editorial Quality



BENEFICIATION by BOUNCE

Two new Michigan operations incorporate recent development

WITHIN the last few months, Whitaker & Gooding Company, Ypsilanti, Mich., has not only placed two new sand and gravel plants in operation, but has incorporated in each a pre-sizing plant and related equipment unique in this industry.

At both plants the particular phases referred to involve beneficiation of gravels produced. While such upgrading of gravels is not unusual in many areas—particularly in view of increasing stringency of aggregate specifications—the method employed at Whitaker & Gooding's installations represents a different approach.

The new process is based on differences in the elastic moduli of the several hard stones and the deleterious soft and absorbent stones such as chalk, sandstones, ochre, clay balls, clay stones, ferruginous particles, "limonites," weathered particles and the like. The procedure is termed "elastic fractionation."

With the two new plants located near Ann Arbor and Clear Lake, and an older sand producing facility near Dundee, all in a highly competitive area of southern Michigan, it was mandatory that the operations incorporate a method of beneficiation. This stems from the nature of the gravel deposits available, and from the need for upgrading these materials if Michigan highway specifications for concrete aggregates were to be met with any stable production.

The method developed and placed in use for the first time at Whitaker & Gooding's two new plants is the result of more than years of carefully and systematically conducted research and development work at the Leslie Laboratories of Ann Arbor, Michigan. O. E. Gooding, president of the firm, had observed the classification of stones that thinner stones at conveyor discharge points and felt that there must be a logical explanation of the phenomenon. The matter was called to the attention of Dr. E. H. Leslie, owner of the Leslie Laboratories, and on whose property Mr. Gooding

Pit and Quarry — October, 1957

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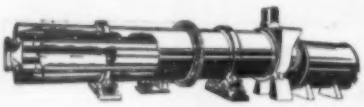

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DOUBLE-SHELL
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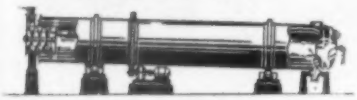

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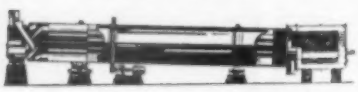

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SINGLE-SHELL DIRECT-HEAT
PARALLEL-FLOW DRYERS

SINGLE-SHELL DIRECT-HEAT
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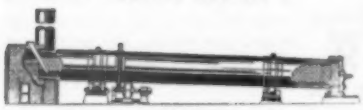

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Enter 132 on card, page 101

Legal Decisions

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

During the last few weeks the higher courts in different localities rendered several unusually important decisions designed to assist manufacturers, processors, buyers, and sellers of nonmetallic products to avoid future complicated law suits. Obviously readers and their lawyers may advantageously cite these leading higher court citations.

Mining is Special Service

A few weeks ago a higher court held that taking sand and gravel from a river or other locality is a mining operation and not subject to a zoning law which prohibits operation of a sand and gravel plant or pit.

For illustration, in *Hazard v. Shurtz,* 310 Pac. (2d) 830, the testimony showed that a man, named Shurtz, applied for and received a permit to mine sand and gravel by use of a silent drag that pulls materials from a 600-ft. angle in the river up a ramp into a hopper.

A state law provides that mining operations are specifically exempted from the provisions of the County Planning and Zoning Act in this locality. Another law prohibits operation of sand and gravel pits and other manufacturing businesses in this area.

In subsequent litigation, the higher court held that the permit granted to Shurtz could not be revoked and said:

"The question 'Is a sand and gravel pit mining?'—should be answered in the affirmative. The operation of the sand and gravel pit is not subject to the zoning law at all and the proceeding before the Board of Adjustment is a nullity and of no effect."

Validity of Contract

A few weeks ago a higher court held that irrespective of peculiarities of a contract between a buyer and seller, such contract is valid and enforceable.

For illustration, in *Jones Ready-Mix Concrete v. Cox,* 301 S. W. (2d) 12, the testimony showed facts, as follows: On June 23 Jones Ready-Mix Concrete purchased a Ford 3-ton truck, together with a concrete mixer installed thereon, from an automobile dealer named Cox. The purchase price for the equipment, including finance charges, amounted to $9,085.44. The parties executed a conditional sales contract in the usual form, which provided for 24 monthly payments of $378.56 each, the title to remain in the automobile dealer's name until the equipment was paid for. Jones Ready-Mix Concrete made the agreed monthly payments until the principal indebtedness was reduced to $5,418.24, and then refused to make any further payments.

During the trial an official of Jones Ready-Mix Concrete testified that the firm had an agreement with Cox that the equipment would be paid for solely and absolutely out of the net profits derived from the use of such equipment, and that if and when such profits were insufficient to make the payments, Jones Ready-Mix Concrete would have the right to return the equipment to Cox.

The higher court listened to all testimony and decided that under these circumstances Cox could not recover $5,418.24 due on the equipment but must take it back and cancel the indebtedness owed by Jones Ready-Mix Concrete.

This court explained that when two parties make an agreement, the court will endeavor to uphold its validity although the clauses therein are unusual and extraordinary and appear to be contradictory.

Prior Illness Avoids Compensation

Last month a higher court held that if an employee had a prior serious disability, he cannot recover compensation under the State Workmen's Compensation Act for a similar injury or disability.

For illustration, in *Burris v. Workmen's Compensation Board* 141 N. E. (2nd) 424, it was shown that a concrete worker, named Burris, collapsed and died from heart failure.

In subsequent litigation the higher court refused to award compensation to Burris's dependents saying that the testimony showed that Burris was suffering from a chronic rheumatic heart disease, and that his heart had so deteriorated that any exertion became an overexertion.

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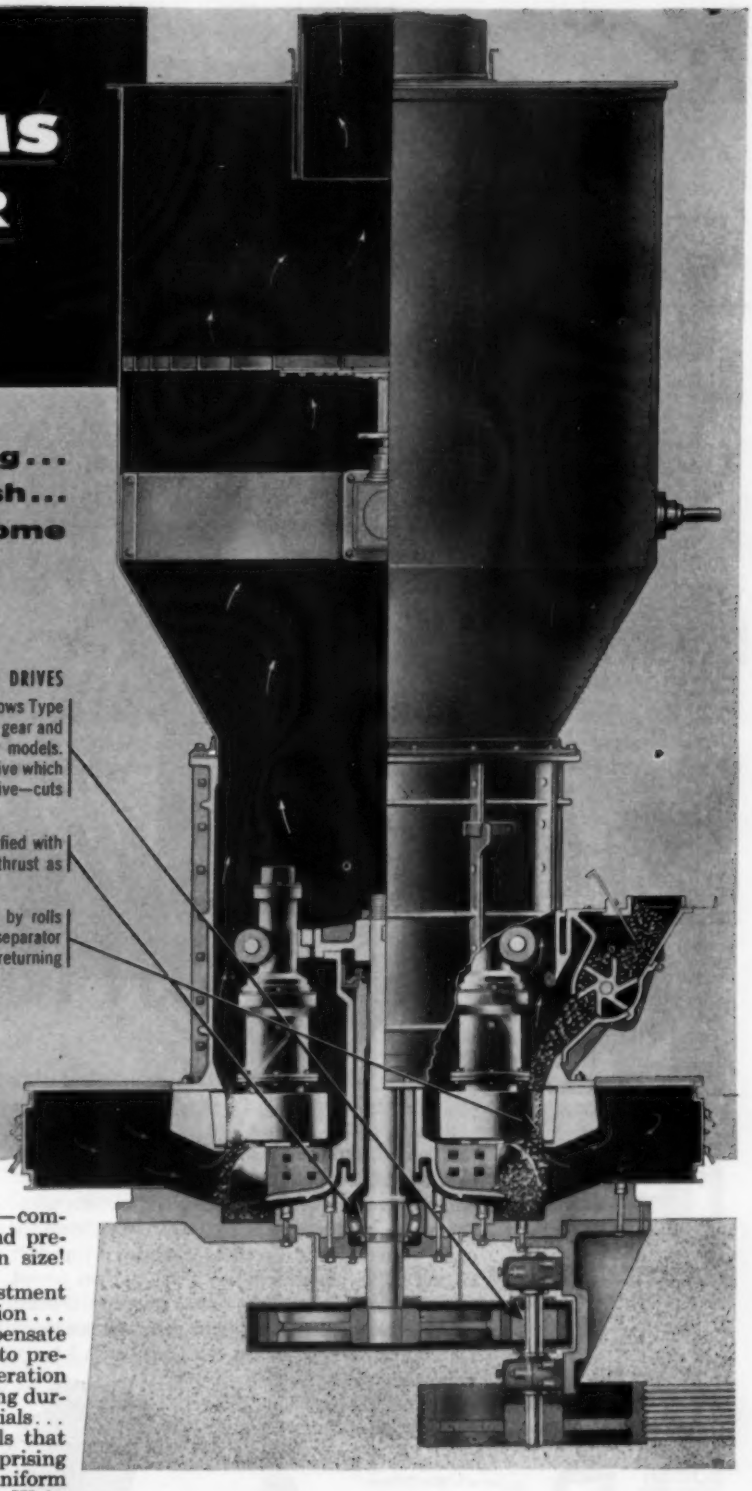

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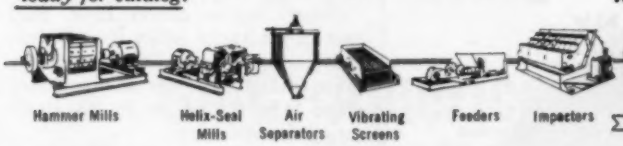

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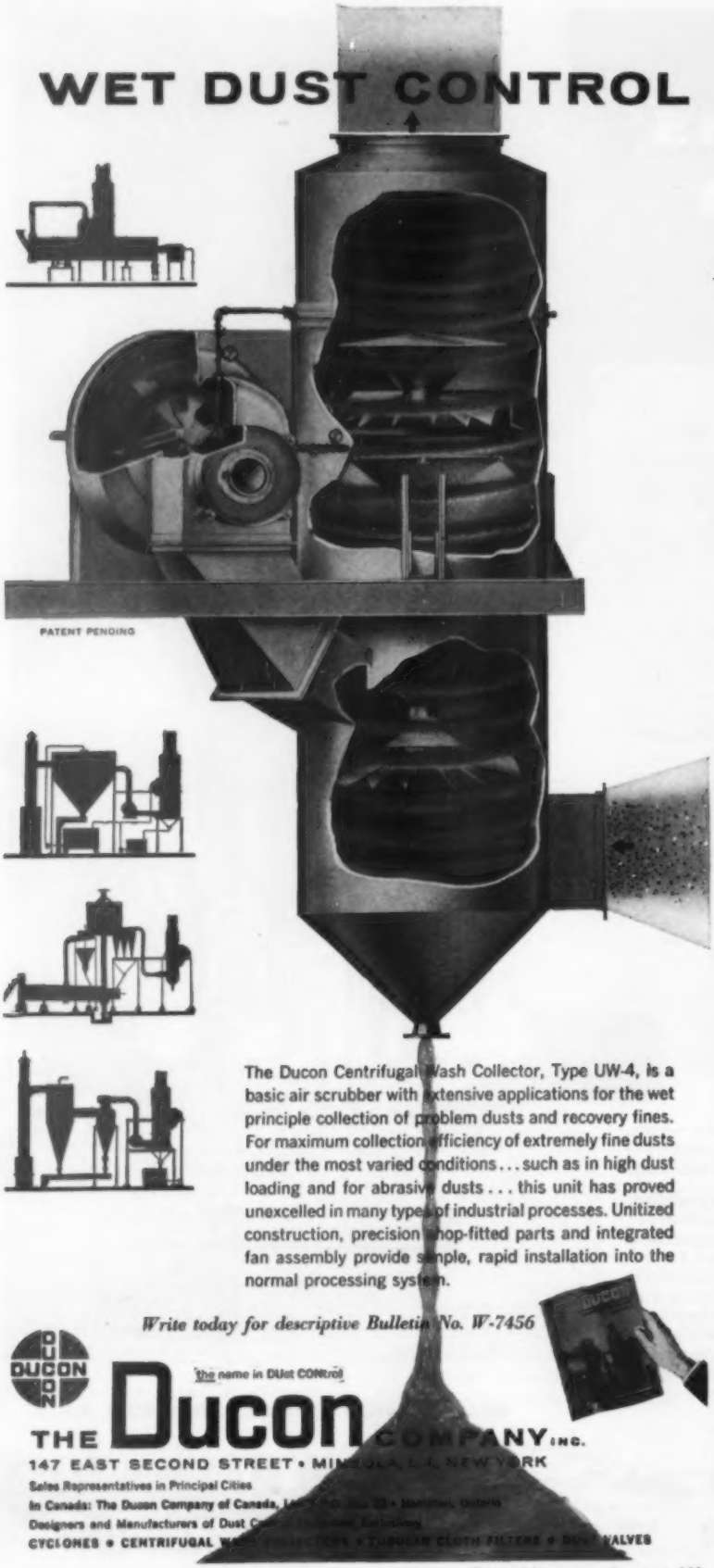

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Deception

Sometime ago I received a letter from a manufacturer of concrete blocks, as follows: "Can an insurance company refuse to pay a loss if the insured had practiced fraud and overestimates his loss? Please explain this law to me."

The higher courts consistently hold that any attempt on the part of the holder of an insurance policy to defraud an insurance company automatically invalidates the insurance policy, and the insured will not receive payment for any loss.

For example, in the late case of *Bockser v. Dorchester Fire Insurance Company,* 99 N. E. (2d) 640, the testimony showed these facts: A fire destroyed all of a manufacturer's real property, office furniture and fixtures, and some materials. When an adjuster of the insurance company came to see the manufacturer, an employee presented a receipted bill for destroyed materials amounting to $17,519.90. Later the insurance company discovered that this amount has been increased from $5,200.

In subsequent litigation, the higher court held that the insurance company need not pay the concrete block manufacturer any insurance loss, and said:

"There were detailed misrepresentations upon a false bill prepared upon a genuine billhead."

For comparison, *see Gechijian v. Richmond, Ins. Co.* 298 Mass. 487. Here the holder of an insurance policy knowingly exaggerated the value of his destroyed merchandise in order to be in a more advantageous position to be paid by the insurance company for the loss he suffered. The court held that the insured had made an attempt to defraud the insurance company and hence he could recover no payment. The court said:

"The law is settled that the furnishing to the insurers by the insured of a statement of values that he knows to be false, for the purpose of securing an advantageous position in the settlement of the loss, is a fraudulent design which constitutes an attempt to defraud within the provisions of the standard policies and vitiates of the insurance policy even though the insured may not have intended to secure more than his actual loss."

Other higher courts have held that an insurance policy is automatically rendered void if the testimony shows that the holder of the policy made false statements in his application for insurance.

Allison TORQMATIC Transmission—patterned after the automatic drive that made its fame in giant earthmovers—is now available in a complete line of GMC trucks—with V8 or six-cylinder power—single or tandem axles—conventional or dual-purpose models

Nothing like a GMC Money-Maker with Allison TORQMATIC "Drive"!

"Drive" is right! Load your GMC right up to top capacity—make your own "roads" through muck and mire—or point it up the toughest grades—and you'll discover what *real* haul-ability is. Allison Transmissions have been putting that kind of "go" in giant earthmovers for more than 10 years now.

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All these Allison TORQMATIC benefits are now available in GMC Money-Makers blanketing the entire 19,500-46,000 GVW range. Get the rest of the facts and figures at your GMC dealer's!

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GMC Money-Makers available in models from ½ to 45 tons

Buyer Uses Defective Pump

The operator of a concrete block plant asked this question: "If a seller breaches a guarantee, is he liable in full damages to the buyer? Is the buyer liable to the seller for damage to purchased equipment while it is in his possession?"

The answer generally is: If a buyer knows that purchased merchandise or equipment is defective, he must return it to the seller immediately. If he uses it, he must pay the full contract price.

For example, in *Price-Williams v. Maier,* 210 S. W. (2d) 499, it was shown that a dealer sold a pump and a 13-ft. joint of pipe for $525 to the operator of a quarry. The bill of sale issued by the seller stated that he would deliver to the buyer "one 10-in. Layne Pump, and 110 ft. of column complete, and it is guaranteed to be in A-1 workable condition," for the sum of $525.

The buyer installed the pump and found that it was not in A-1 workable condition. In later litigation he testified that the pump was caked with rust, its bearings were worn, the suffing boxes were worn out, and water would drown out the oil. On the other hand, the seller proved that the buyer had continued to use the pump after discovering its defective condition. Actually the mechanic, employed by the buyer, testified that he continued to operate the pump in its known defective condition, because he was trying to finish a job.

The higher court held that the buyer could not recover back from the seller $525, the purchase price of the pump, and said:

"Of course, appellant (buyer) could not recover the value of the pump would have had if he had not burned it up in the attempt to finish the job before it did burn up, and appellee (dealer) must be credited with the amount or extent of the damage which he (buyer) did to the pump in its improper use after knowing its defective condition."

Liability in Drownings

A reader asked this question: "Is a sand and gravel company obligated to fence or barricade a dangerous excavation, hole or pond to protect adventurous and trespassing children against injuries?"

According to a late higher court decision, the answer is no.

For example, in *Holifield v. Wigdor Company,* 235 S. W. (2d) 564, the testimony showed that there was a good deal of rainfall after a hole was dug by a company and soon the hole was filled with water.

One day a small boy entered the water-filled excavation and was drowned. The parents of the boy sued the company for heavy damages. In holding the latter not liable, the higher court said:

"At most, the failure to place a fence or barricade around the hole was no more than 'mere casual negligence.' "

This court went on to explain that if a minor is injured or suffers death by reason of an attractive nuisance which the property owner fails to safeguard against minors, the property owner may be liable. But in each case the outcome depends upon the presented testimony.

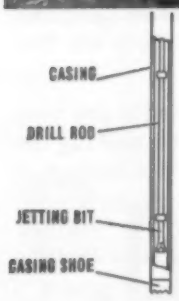
Not Mineral Lease

A few weeks ago a higher court explained the legal differences between a contract and a mineral lease for federal income tax purposes. This court held that if unmined materials under a contract may revert to the owner of the land, such a contract is a one for sale of an asset with the consideration taxable for income tax purposes as a *capital gain,* rather than a mineral lease

What's down there?

Empire TEST DRILLS come up with the RIGHT ANSWERS

EMPIRE Hydraulic Testing Drill



This test-drilling equipment is a "must" for pit and quarry operators and general contractors.
The EMPIRE Junior Drill used manually with solid rods or the EMPIRE Hydraulic Jetting Drill, using hollow rods, is the standard method of exploring sand and gravel deposits for composition and presence of clay, and accurately determines overburden depth and formation.
Easily transported in any kind of terrain. Assembled and ready for work in minimum time with ordinary labor.

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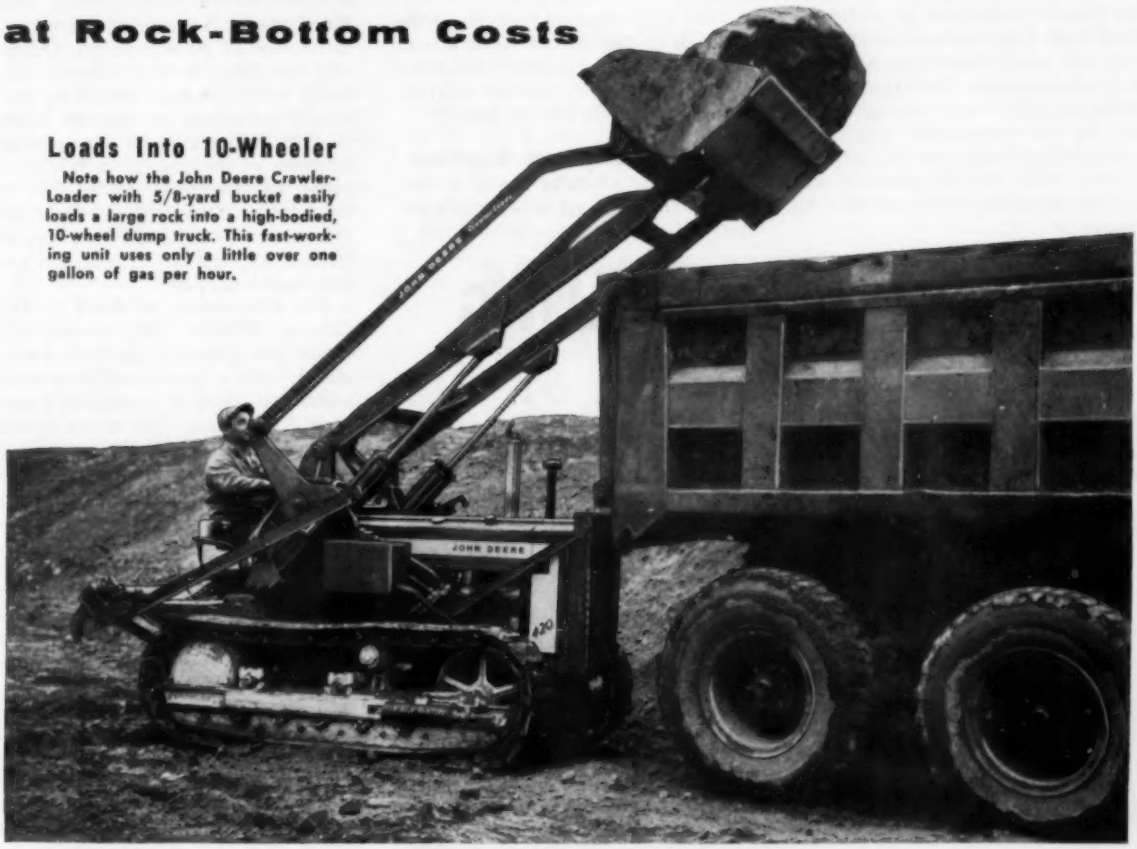

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Note how the John Deere Crawler-Loader with 5/8-yard bucket easily loads a large rock into a high-bodied, 10-wheel dump truck. This fast-working unit uses only a little over one gallon of gas per hour.

MATCH the work output of larger tractors on many jobs . . . hold down your costs all the way . . . with the John Deere "420" Crawler-Loader—a versatile, high-quality unit that you'll find mighty profitable to own.

Amazing power for its size . . . compact design . . . clutch-brake steering . . . and the fast, handy direction reverser are some of the many features that put the John Deere in a class by itself for speedy, low-cost maneuverability and daily work output.

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with consideration taxable as *ordinary* income.

For illustration, in *Crowell Land and Mineral Corporation v. Commissioner of Internal Revenue*, 242 Fed. Rep. (2d) 864, it was shown that the owner of land with sand and gravel deposits sold and conveyed with full warranty of title all sand and gravel underlying property to a corporation. The amount of money payable to the owner of the land by the corporation was to be computed according to the amount of sand and gravel removed, and that the company had five years to remove it.

In subsequent litigation the higher court held that the contract was one for sale of an asset with the consideration taxable for income tax purposes as a capital gain rather than a mineral lease taxable as ordinary income. The court said:

"We think that an analysis of the contract of sale and of what was to be, and was, done under it completely rebuts the theory that the arrangement was merely one of lease."

Must Comply with Contract

Recently, a reader wrote as follows: "If a contract between a buyer and seller states that crushed rock is being sold at a stipulated price per yard, can the seller collect payment based on the number of loads or upon the measurement of the material after delivery on a job?"

A leading higher court held that a seller always must comply with the terms of the original contract as to method of measurements. Generally speaking, if a purchaser contends that a contract should be construed according to unusual rules, or rules different from the ordinary meaning of the law, he is bound to prove his assertions. If he fails to do so, the court will interpret the contract to mean that which was intended by ordinarily prudent and reasonable persons.

For illustration, in *Ricci v. McGovern*, 149 Atl. 860, it was disclosed that a quarry furnished a contractor with a large quantity of stone which was used as riprap on a municipal causeway. The court agreed that the quarry should be paid a stipulated price per cubic yard for wall stone and a higher price per cubic yard for quarry stone. A dispute arose as to the method by which the yardage of the stone was to be determined. The quarry owner claimed that the amount due was to be determined by measuring the stone after it had been placed in position on the slope of the causeway, and the contractor contended that the yardage was to be determined by the number of truck loads, on the basis of three cubic yards of stone to each load.

Since the quarry owner failed to prove that the original agreement meant that payment should be based upon measurement on the causeway, the higher court held that the contractor could pay for the stone on the basis of three cubic yards to each motor truck load. This higher court explained that a seller who demands payment for stone or other material on a higher than usual basis must conclusively prove his contentions; otherwise he cannot expect a favorable verdict.

Liability for Employee's Contract

Considerable discussion has arisen from time to time over the legal question: When and under what circumstances is an employer liable for a contract or agreement made by an employee?

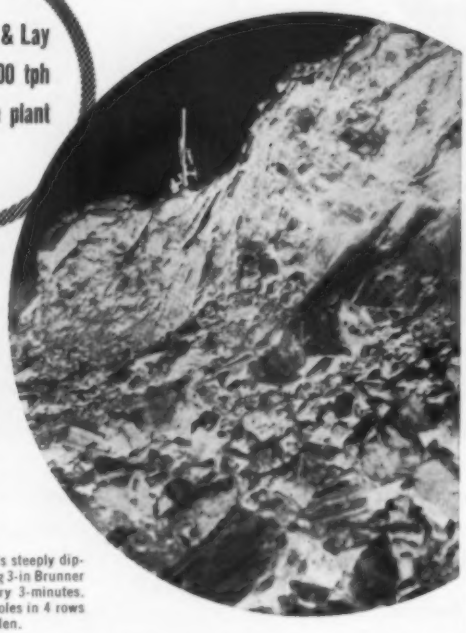
A leading higher court answered this legal question by stating that an employer is liable for all acts committed by an employee who acts within the scope of the employment.

For illustration, in *Heard v. M.*

ROUND-HOLE DRILLING

...with Brunner & Lay Rok-Bits keep 200 tph dolomitic agstone plant on schedule

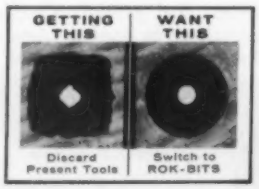
Brunner & Lay carbide Rok-Bits in these body types—cross, chisel, "X", cutaway, taper socket. Furnished in standard wagon drill and hand held drill threads, also—600, 400, 200 and J-7.50 threads. Bit sizes up to 6½-in in our Hole-Master.



A 30-ft quarry face is worked in this steeply dipping limestone formation. Drills using 3-in Brunner & Lay Rok-Bits average 2 ft. every 3-minutes. Drilling pattern provides 40 to 50 holes in 4 rows drilled on 14-ft space and 10-ft burden.

Blast hole drilling jobs go fast—costs stay low—when you drill ROUND holes. Non-rifled Rok-Bit holes. Rods pull easily. Loading is faster. This is the experience of Campbell Limestone Co., Blacksburg, S.C., and of hundreds of other Rok-Bit users who chose bits through competitive tests.

Brunner & Lay Rok-Bits give increased drilling speed, greater footage life, fewer bit changes and lowest cost per foot of hole drilled. Put their cost cutting features to work for you. Write for NEW catalog #756. Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill. Plants & warehouses: Philadelphia, Asheville, Birmingham, Dallas, Denver, Los Angeles, Portland, Ore., Montreal.



Brunner & Lay Products

CARBIDE ROK-BITS • INTRA-SET STEEL • DRILL RODS • COUPLINGS, ADAPTERS & EXTENSION STEEL

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Sand & Gravel Company, 116 So. 386, the testimony showed that a landowner, named Heard, assisted an employee of a sand and gravel company to obtain a contract with another landowner, named Faulk, by which the sand company was given the exclusive right to remove gravel and sand from Faulk's land. On the day following the signing of this contract, the employee of the sand company signed another contract agreeing to pay Heard 2½ cents per cubic yard for all sand and gravel removed from Faulk's land as a bonus for having induced Faulk to sign the original contract.

The sand and gravel company began to mine the materials, and for three years the employee regularly paid Heard 2½ cents bonus. After three years the sand and gravel company refused to pay Heard further commissions, and the latter sued to recover damages.

The counsel for the sand and gravel company attempted to avoid liability upon the contention that the company had not authorized its employee to agree to pay Heard a commission to the amount of the sand and gravel taken from Faulk's land.

Nevertheless, the higher court held that the sand and gravel company was bound to pay Heard 2½ cents commission on all materials taken from Faulk's land.

The court explained that the sand and gravel company must be liable on the contract made by its employee because the testimony showed that the company's officials impliedly acknowledged the employee's authority to bind the company when the employee paid commissions to Heard for three years and the company made no objections thereto.

Water Damage

A few weeks ago a higher court held that a state, county, or municipality which negligently causes overflow of water on private property is liable for resultant damages.

For illustration, in *Ward Concrete Products Company v. County Flood Control District,* 309 Pac. (2) 546, the testimony showed that the Ward Concrete Products Company operated a plant for the manufacture of concrete building blocks. The finished blocks were stacked or stored on the premises. The company's property was inundated during the rainy season by waters overflowing the banks of a creek nearby.

During the trial the testimony showed that the city officials and employees had installed a grate in the storm drain that resulted in a blockage by accumulated debris and caused water to overflow onto the property of the Ward Concrete Products Company. Therefore, the higher court held that the Ward Concrete Products Company could recover adequate damages from the city, saying:

"The taking or damaging of private property for the maintenance of an existing public improvement involving a deliberate act which has as its object the direct or indirect accomplishment of the purpose of the improvement as a whole constitutes a taking or damaging of property for a public use and the owner of such property is entitled to compensation."

Employees Assume Risks

The operator of a quarry asked this interesting legal question: "Am I liable in damages for injuries to an employee sustained by his own fault or negligence?"

The higher courts now hold that all employees assume the natural risks of their employment.

For example, in *De Haas v. Cascade, Inc.,* 162 Pac. (2d) 284, the testimony showed that an employee

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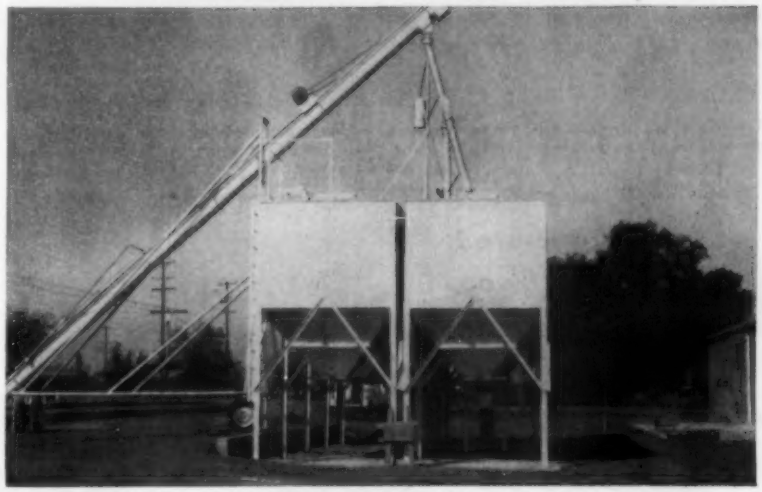

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Use the versatile, efficient DRACON in your operation. It will prove itself —and pay for itself—in just a few weeks!

Use this versatile conveyor, in-plant or out, for moving:

Aggregates	Sugar	Coffee
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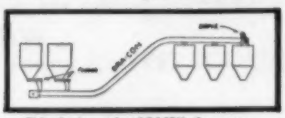
Starch	Chemicals	Salt

. . . many other free-flowing materials IN LENGTHS TO SUIT YOUR NEEDS



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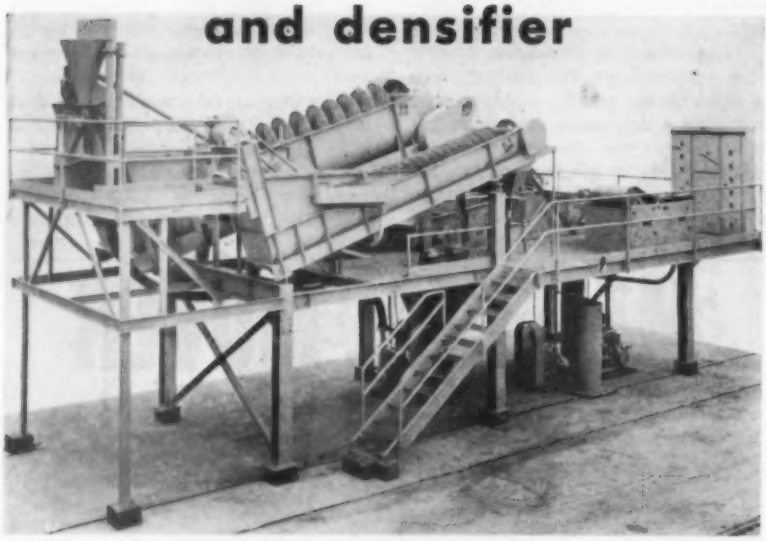
Prefabricated HMS plants with AKINS separator and densifier



Typical Akins 3-product HMS installation with Separator and Densifier. Note how Akins tank construction permits simple supporting structure. These Sweco-built plants are compact, simple in design, and convenient.

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These prefabricated HMS plants are designed, manufactured and erected by the Southwestern Engineering Co., Los Angeles. Akins Separators were selected by Sweco because . . .

Media discharge end of Akins Densifier showing demagnetizing coil.

EXPERIENCE has proved these advantages of Akins

- Gradation of pool density from feed entry point to sink removal point provides natural cleaning of sink, and allows circulation of media at lower gravity and viscosity.
- Gradation of pool density also allows 3-product separation in one machine. Extraction of middlings requires only one media cleaning circuit.
- Start-up under full load, eliminates necessity of draining vessel after shutdowns.
- Variation in rate or grade of feed is not detrimental.
- Large pool area depth and volume minimize tramp refuse in the product and facilitate better recovery of values from fine sizes.

YOU can have all the advantages of Akins equipment AND the combination of mineral dressing and contracting experience offered by CIW and Sweco.

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had worked on a dangerous machine for several days and was fully acquainted with its operation. Later he was severely injured and sued his employer for damages. The higher court refused to allow any damages, saying:

"The dangers incident to his task were open, obvious, and evident, and were assumed by him."

Also, see *Cummins v. Dufault*, 18 Wash (2d) 274, 139 P. (2d) 308, 315. In that case the employee was injured when he fell from a tramway. He knew of the conditions surrounding his place of work. In holding that he assumed the risk of the danger incident to the work, this court stated:

"If the condition of the walk contributed to his fall, it was a condition which he assumed when he undertook the task assigned to him."

Also, modern higher courts consistently hold that willful violation of a company's rule by an employee bars him from recovering damages or compensation for an injury under the State Workmen's Compensation Act.

See *Carrico v. State Compensation Com'r*, 33 S. E. (2d) 281. In this case it was shown that an employee disobeyed a company rule that all employees must wear approved goggles while engaged in certain kinds of work.

The employee suffered serious facial injuries when he violated this rule. He testified that he was not using the goggles because the work he was doing required good sight and that the goggles steamed up.

The higher court held that the employee's intentional violation of his employer's rule relieved the employer from damage liability.

Mississippi Valley's Plant To Begin Production Soon

Work has been progressing satisfactorily at the Mississippi Valley Portland Cement Company's $3,700,000 plant, located at Redwood, 14 miles north of Vicksburg, Miss. Production is slated to begin early this year.

Rated capacity of the plant will be 2,000 bbl. of cement per day, or about 680,000 bbl. annually. Located on the Yazoo River, the facility will occupy approximately 30 acres. The firm's 1,140-acre property includes 180 acres which have been found to contain raw material adequate for 40 years of operation.

Robert W. Hyde is president of the firm, and Henry V. Allen is executive vice-president. The latter will serve as manager of the new plant.

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Power Lubrication Rig

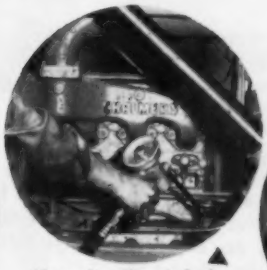
OFFERS 3 BIG SAVINGS!

1. Save Time—bring lubrication right to the job, safely, efficiently! *2. Save Money*—cut lubrication downtime! *3. Save Equipment*—give the added protection of positive power lubrication!

The compact new rig shown here is just one example of how Alemite can furnish you a "custom-made" unit that fits your exact needs. Does the *complete* job! Shown equipped with the following standard Alemite products:

- **Air-operated high-pressure lube gun.**
- **Air-operated gear oil pump.**
- **Loader pump for refilling hand gun.**
- **"Big-A" Bucket Pump.**
- **55-gal. air-operated motor oil pump.**
- **Bank of 4 hose reels, including high-pressure, air, gear lube and motor oil lines.**
- **Standard air compressor.**

Air line equipment for on-the-job tire inflating, air cleaning!



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Fast, easy, high-pressure lubrication of all bearings equipped with hydraulic or button-head fittings!

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Industry Personalities

Two executives of the Green Bag Cement Division of Pittsburgh Coke & Chemical Company, Pittsburgh, Pa., have been promoted, according to L. R. Forbrich, general manager of the division.

JACK M. MURRAY was advanced to the newly-created position of

J. M. Murray

R. C. Rial

director of marketing, while RICHARD C. RIAL was appointed to succeed Mr. Murray as division sales manager.

In addition to directing marketing, Mr. Murray will handle customer relations and will assist the general manager of the cement division in analyzing and formulating new sales policies and plans for the division.

Mr. Rial was assistant sales manager prior to his new appointment.

CARL F. CLAUSEN, director of the Manufacturing Process Department, Portland Cement Association, was honored recently in receiving a membership award from the American Institute of Mining, Metallurgical, and Petroleum Engineers. The award was made at a meeting in Chicago in recognition of Mr. Clausen's participation in an A.I.M.E. membership drive in the cement industry.

RUSSELL REID JR. has been assigned to the Richmond, Va., territory as sales representative for the Standard Lime and Cement Company, Baltimore, Md.

RONALD D. COMB has been promoted to assistant manufacturing manager of the Roofing Granules Division of the Minnesota Mining & Manufacturing Company, St. Paul, Minn.

EDWARD B. KIRBY has been named director of research of New York Trap Rock Corporation, New York, N. Y.

Mr. Kirby, who was engaged by N. Y. Trap Rock in 1936, as a licensed engineer, gained the distinction of having a company-owned barge named after him in April, 1954. He concentrated on sales promotion for many years, serving as a company representative in New Jersey and Staten Island.

S. KEITH PAINTER was recently elected president of Century Rock Products Company, Pasadena, Calif., and of Star Rock Products Company. He was also named chairman of the board of Crown Rock Products Company, of Admixtures, Inc., and of the five affiliated San Gabriel Ready-Mixt corporations.

E. O. RODEFFER, founder of these companies, has been elected chairman of the board of the rock companies and will continue as president of the San Gabriel Ready-Mixt companies and of Admixtures, Inc.

E. J. CUYLER has been appointed sales manager of the Saskatchewan Cement Company Limited. Prior to joining Saskatchewan Cement, he was engaged for some years in the sales and marketing fields.

P. E. Patrick

PHILLIP E. PATRICK, has been appointed assistant sales manager of the Ruberoid Company's sales district in Millis, Mass., with headquarters in that city.

Until recently, Mr. Patrick was a sales representative in Denver, Colo. Prior to joining Ruberoid in 1955, he had been engaged in building material sales.

The board of directors of International Minerals & Chemical Corporation, Chicago, Ill., recently elected three vice-presidents: DR. I. MILTON LEBARON, in charge of research, WILLIAM BELLANO, engineering, and ANTHONY E. CASCINO, marketing.

Dr. LeBaron has been appointed to the research committee, while Messrs. Bellano and Cascino have been named to the administrative and research committees.

HENRY J. HAFFNER has been named to succeed the late Frank Eaches as superintendent of the Green Bag Cement Division of the

H. J. Haffner

J. W. Brady

Pittsburgh Coke & Chemical Company, Pittsburgh, Pa.

Mr. Haffner has been superintendent of the Activated Carbon Division, the position he held until his recent appointment.

JAMES W. BRADY succeeds Mr. Haffner as superintendent of the Activated Carbon Division.

FRANKLIN P. TAYLOR JR. has been appointed vice-president of sales for the Buffalo Crushed Stone Corporation, Bowmansville, N. Y., a subsidiary of Houdaille Industries, Inc. He succeeds Elmer F. Lux, who has resigned. Mr. Taylor was formerly general manager of the Amherst Ready-Mixed Concrete Corporation.

WILLIAM C. IRELAND has been appointed president of the Birmingham Slag Division of Vulcan Materials Company, Birmingham, Ala. With the firm for 19 years, Mr. Ireland has been serving as vice-president of Vulcan Materials.

THOMAS A. HESKITT retired recently from the managership of Alpha Portland Cement Company's sales office in Easton, Pa., after being with the firm for 45 years.

RUSSELL HAWORTH, vice-president of the Potash Company of America, Carlsbad, N. M., has been elected president of the New Mexico Mining Association.

ALFRED R. DOLL has been appointed manager of the National Gypsum Company's Indianapolis sales district. He succeeds John P. Hayes, who was transferred to manage the firm's sales district in Garwood, N. J.

Mr. Doll, who joined National Gypsum in 1940, was formerly sales manager of the Albany (N. Y.) district.

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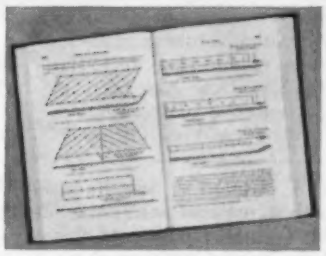

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FLEXCO

"25-PAK"

TWENTY-FIVE COMPLETE SETS OF FLEXCO HD BELT FASTENERS NOW AVAILABLE IN ONE EASY-TO-HANDLE ECONOMY BULK PACKAGE

There's no need now to carry several 10-set boxes to the job—every "25-PAK" contains 25 complete sets of FLEXCO Fasteners (bottom plates, top plates, clips, nuts and bolts) . . . enough FLEXCO Fasteners to join common belt widths (for example: one "25-PAK" box, size 1½E, will join a 36" belt.) Our savings from bulk-packaging are passed on to you!

Label on each "25-PAK" box has chart indicating the number of FLEXCO HD Fasteners to use for given belt widths.

Standard shipping carton contains four "25-PAK" boxes of one size fastener. Keep a supply of "25-PAKS" on hand. Easy to store and inventory, sturdy boxes and shipping cartons have many uses.

Ask your FLEXCO distributor or write to us for additional information.

Flexible STEEL LACING COMPANY

4623 LEXINGTON ST. • CHICAGO 44, ILL.

FOR THE SPLICE OF A LIFETIME

Enter 144 on card, page 101

Manufacturers' News

Announcement has been made of the appointment of FRANCIS J. MARDULIER as manager of Cement Mill Products for the Chemical Specialties Departments, Dewey and Almy Chemical Company, Cambridge, Mass.

Mr. Mardulier, whose responsibilities formerly were divided between cement mill products and construction specialty chemicals, will devote full time to cement mill products, which include grinding aids for cement, retarders and plasticizers for grouting mixtures and oil well cements, and solutions for the manufacture of air entraining cement.

F. J. Mardulier

H. W. Dow Jr.

H. W. DOW JR. has been appointed manager, New York District Office, of the Engine Division of the Nordberg Manufacturing Company, Milwaukee, Wis. Mr. Dow succeeds A. R. MCMULLIN, who retired on December 31, 1957, after serving as manager in New York since 1936.

Mr. Dow joined Nordberg in 1943, entering sales engineering in 1945. Since 1955 Mr. Dow has been a special representative of the Engine Division in the New York Office.

JOSEPH A. GRODEN has been named eastern regional sales manager of the Bagpak Division of the International Paper Company, New York, N. Y. Mr. Groden will supervise sales of International Paper's multiwall shipping sack division in a 14-state area along the eastern seaboard from Maine to North Carolina.

Mr. Groden, who has been associated with International Paper since 1940, formerly represented the Bagpak Division in the Boston area.

WILLIAM C. KURTZ has been appointed manager of truck tire sales at the Detroit, Mich., sales office of the General Tire & Rubber Company, Akron, Ohio.

Kennedy Van Saun Manufacturing & Engineering Corporation, New York, N. Y., has developed a Test and Research Center at Danville, Pa., to provide aid in solving problems in grinding, crushing, calcining, classifying, and screening.

The Center is thoroughly equipped and staffed to provide comprehensive research and recommendations from simple screen analysis to complete, detailed testing of large scale processes, including all steps encountered in actual full-scale operation. These facilities are available to industries of all sizes throughout the world for the development of new processes and the improvement of existing procedures.

Schield Bantam Company, Waverly, Iowa, announces a new sales-service training school for its distributor salesmen throughout the United States and Canada.

Included in the school's program are such fields as engineering and design features, product application, markets, selling aids and tools, analysis of competitive equipment, financing and sales accountancy, and general sales policies of the company.

Classes in the new sales-training school started the first week in January. Additional three-day sessions are scheduled at regular intervals during the winter and early spring.

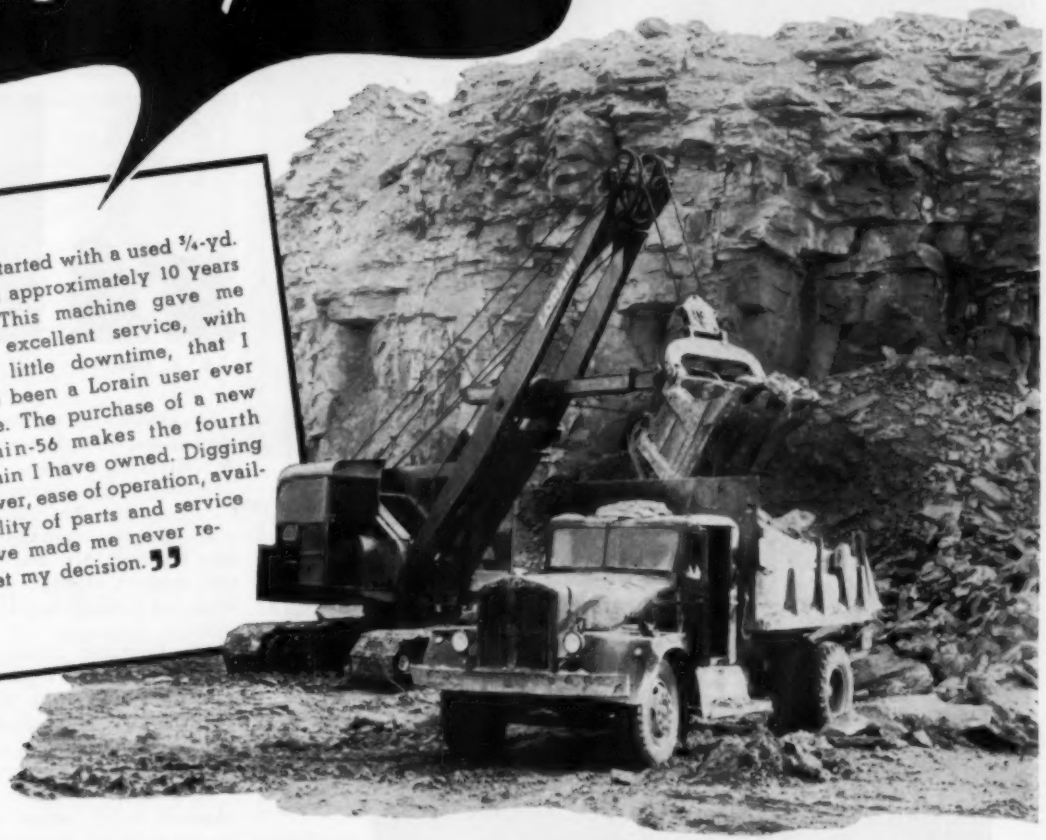
Construction has begun on a 289,000 sq. ft. addition to the General Motors Detroit Diesel Engine Division plant in Detroit, Mich. Completion is expected some time in the spring. The new building will house all final assembly, testing, and shipping facilities for Detroit Diesel.

The Chase Bag Company Paper Bag Division, New York, N. Y., has named three new territory sales managers. They are P. E. Nelson, southeastern sales manager in Atlanta; Bill Sheets, midwestern sales manager in Chicago; and K. L. Moore, eastern sales manager in Buffalo.

Mr. Nelson has been manager of the New Orleans sales office for the packaging firm since 1956. He joined Chase Bag in 1938 as a sales representative. Mr. Sheets became a specialist in Multiwall sales for Chase in Chicago last year, and Mr. Moore joined the firm in 1956 as a Multiwall sales engineer in Buffalo.

Here's why Allan Simpson bought his 4th LORAIN–

Allan Simpson, Beaver Falls, Pa., is shown here using his 1¼-yd. Lorain-56 at the Ellwood Stone Co., Koppel, Pa., to load sandstone. Working two shifts a day, the Lorain-56 more than keeps up with crusher capacity.



"I started with a used ¾-yd. Lorain approximately 10 years ago. This machine gave me such excellent service, with very little downtime, that I have been a Lorain user ever since. The purchase of a new Lorain-56 makes the fourth Lorain I have owned. Digging power, ease of operation, availability of parts and service have made me never regret my decision."

You, too, like Allan Simpson, will never regret the purchase of a 1¼-yd. Lorain-56. Here are just a few reasons why:

"Shear Ball" Turntable Mounting
Turntable is secured to crawler and revolves easily and freely on a huge, sealed "ball bearing." There is no center pin or nut, centering gudgeon or exposed roller path . . . no turntable rollers . . . no constant adjustment, maintenance or lubrication problems.

2-Lever, "Joy-Stick" Air Controls
Fewer levers, fewer motions, faster, smoother, less effort, less fatigue, more output. By feeding "metered air" to clutches at any rate desired—the operator retains that "old-time feel" of all turntable operations.

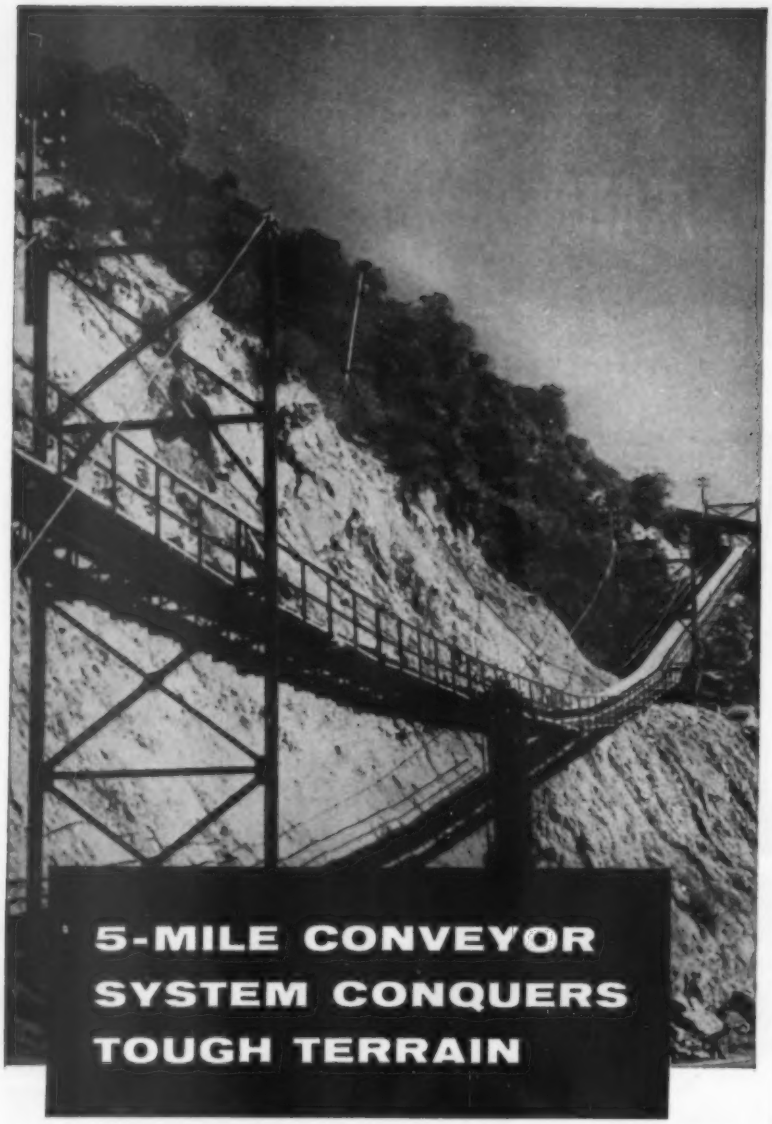
Torque Converter Power-Take-Off
Smooth, "never-say-die" power. No stall due to any digging circumstances. Automatically adjusts torque to job demand.

Full Air Power Control of All Crawler Operations
Propelling the crawler—travel locking pawls, travel jaw clutches, crawler steering, swing lock are all easily controlled with "Air-Ease" power.

Your Thew-Lorain Distributor will be glad to show you additional reasons why the "56" is a top value buy in the 1¼-yd. class. See him now for complete details.

THE THEW SHOVEL CO., LORAIN, OHIO

THEW LORAIN®



To build India's huge Bhakra Dam, sand and gravel must be brought over three miles of mountainous terrain. In one section a suspension span supports a 1700-ft. long, 36" wide belt conveyor which carries 750 tons per hour at 485 FPM up a 107-ft. lift. Another two miles of belt conveyors move aggregate through processing operations.

Equipment, including 51 conveyor units, 25 speed reducers, vibrating equipment, and other machinery, was designed and manufactured by Hewitt-Robins. To find out how H-R products and services can help you, consult your classified telephone directory for the nearest H-R representative, or contact Hewitt-Robins, Stamford, Connecticut.

HR HEWITT-ROBINS

CONVEYOR BELTING AND IDLERS . . . POWER TRANSMISSION DRIVES
INDUSTRIAL HOSE . . . VIBRATING CONVEYORS, SCREENS & SHAKEOUTS

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The appointment of RUSSELL S. STEWART as sales manager of the Viber Company, Burbank, Calif., has been announced. Previously associated with the C. H. Jones Equipment Company, Salt Lake City, Utah, Mr. Stewart has many years of experience in construction equipment selling.

Also announced is the promotion of O. L. WHITMAN to the position of assistant manager of the Viber Company.

R. S. Stewart

E. G. Hartman

E. GEORGE HARTMAN has been elected vice-president—sales of John A. Roebling's Sons Corporation, Trenton, N. J., succeeding ERNEST C. LOW, who has retired after 47 years with the company. W. C. PALMER succeeds Mr. Hartman as general product manager of Roebling's Wire and Cold Rolled Products Division.

Mr. Hartman joined Roebling in 1940. For 20 years prior to that, he was associated with the Wickwire Spencer Steel Division of The Colorado Fuel and Iron Corporation.

A new plant, to be devoted exclusively to the repair and retreading of giant off-the-road tires, is being constructed at Sacramento, Calif., by the Goodyear Tire & Rubber Company, Akron, Ohio.

The new plant is scheduled to go into operation on April 1, 1958, with facilities to retread off-the-road tires ranging in size from 1100x24 to giant 29.5x29. The plant will also house ten curing bands for top-capping the big off-the-road tires.

WALTER E. CROWTHER has been named manager of the Personnel Relations Department for the Western Machinery Company, San Francisco, Calif.

J. HOWARD PETTY and RONALD C. PIERCE have recently joined the Atlanta, Ga., district office of the Lincoln Electric Company, Cleveland, Ohio, after completing a one-year training program at the firm's Cleveland plant.

W. SPENCE FLINN has joined the Standard Steel Corporation, Los Angeles, Calif., as southeastern district representative for the sale of asphalt plants and accessories.

From his headquarters in Chattanooga, Tenn., Mr. Flinn will coordinate Standard's dealer activities in the states of Arkansas, Alabama, South Carolina, Kentucky, Maryland, Louisiana, Georgia, North Carolina, Virginia, Mississippi, Florida, Tennessee, West Virginia, and the District of Columbia.

Directors of the Chain Belt Company, Milwaukee, Wis., have announced the election of an executive vice-president and three new vice-presidents.

O. W. CARPENTER, the newly-appointed executive vice-president, joined Chain Belt in 1943 as assistant to the vice-president. He became vice-president and a director in 1948, and vice-president—construction machinery and finance in 1956.

W. C. MESSINGER has been promoted to vice-president—Construction Machinery Section, with executive responsibility for the General Road Machines Div., the Burmesiter Div., and Chain Belt's California plant operation.

E. M. RHODES, vice-president—Industrial Equipment Section is responsible for the five Industrial Divisions comprising the Industrial Equipment Section.

G. H. WOODLAND, vice-president—marketing, will be responsible for the field force, sales policy, marketing methods, and distribution of the products of the Industrial Equipment Section.

Pettibone Mulliken Corporation, Chicago, Ill., has appointed JOHN J. NEWSOME JR. New York area branch manager for sales and service of construction equipment.

Mr. Newsome will be in charge of operations at Pettibone's branches at Paramus, N. J., and Amityville, L. I.

Hercules Motors Corporation, Canton, Ohio, will take over the manufacture of two Lycoming air-cooled industrial engines, now being made by the Lycoming Division, Avco Manufacturing Corporation, in Williamsport, Pa.

The industrial engines being taken over by Hercules are known as the C2-90 and the CV4-180. Both are valve-in-head air-cooled engines, designed for general applications.

Portable VEHICLE SCALES

Each section a complete scale—easily joined for greater length and capacity.

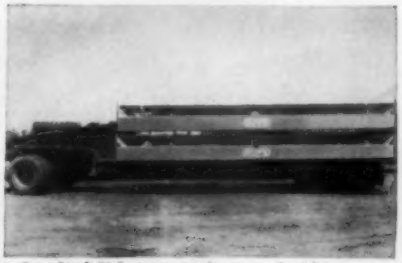
weigh anything ...anywhere!

Here's the perfect portable vehicle scale . . . rugged, self-contained, easy to install and move, no pit required . . . *accurate!*

Capacities from 20 to 70 tons—lengths from 20 to 60 feet. Individual sections can be joined with *just 8 bolts* for greater length and capacity.

And you can select any weight indication—full capacity beam, type recording beam for printed records, or attachable Weightograph® for direct enlarged visual readings.

All this *plus* the extra ingredient—a solid century of scale skill built into every Howe Scale. Don't settle for less.



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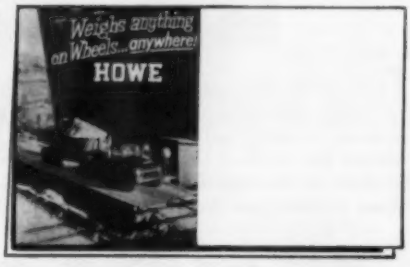

CENTENNIAL 100 YEARS HOWE 1857 1957

The HOWE SCALE Co
A SUBSIDIARY OF SAFETY INDUSTRIES, INC,
RUTLAND • VERMONT

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Three sales managers have been appointed to head regional U. S. industrial sales of Work Bull products manufactured by the Massey-Ferguson Industrial Division, Massey-Harris-Ferguson, Inc., Wichita, Kans.

John Vilven is the new western regional industrial sales manager; Bill Talmadge is central regional industrial sales manager; and eastern regional sales manager is C. M. Workman.

Louis J. Smith has been elected vice-president and sales manager of the Chiksan Company, Brea, Calif., and Chiksan of Canada, Ltd., and Edward T. Landgraff has been made vice-president and sales manager of the Chiksan Export Company. These promotions were made as a result of the resignation of G. R. Winder as vice-president and general sales manager of Chiksan and its two subsidiary companies.

Mr. Smith joined Chiksan in 1948, and has been eastern regional sales manager since 1951. He will make his headquarters at Chiksan's main office and plant in Brea.

A member of the Chiksan organization since 1946, Mr. Landgraff served as export sales manager prior to his recent appointment. He will continue to headquarter at the company's Newark, N. J., office.

Two top executive changes have been made by the Wheelabrator Corporation, Mishawaka, Ind.

Otto A. Pfaff, chairman and president, has retired as president and will continue as chairman of the board. James F. Connaughton, executive vice-president, has been elected president.

Mr. Pfaff has been with Wheelabrator since 1916, and served 22 years as general manager and 17 years as president and general manager.

Mr. Connaughton resigned last June as president of American La-France Corporation to join Wheelabrator. He is a former vice-president and general manager of the Eddystone Division of Baldwin-Lima-Hamilton.

Raymond Mancha, for the last 12 years ventilation vice-president with the Joy Manufacturing Company, Pittsburgh, Pa., has retired from active business.

John H. Jett, acting general manager of the Vulcan Iron Works Company, Denver, Colo., since 1956, has been elected vice-president and general manager of the firm.

Western Precipitation Corporation, Los Angeles, Calif., has named Gilbert G. Schneider sales manager for its new product line, the Doyle-Turbulaire scrubbers.

A member of Western Precipitation since 1951, Mr. Schneider has had sales engineering experience in the firm's Los Angeles, New York, and Atlanta offices, handling dust and fume control installations. He was assigned to the firm's Pittsburgh offices, prior to his recent appointment.

G. G. Schneider

J. G. Hanna

Vickers Incorporated, Detroit, Mich., has made James G. Hanna district manager of its mobile products sales office for the Chicago area.

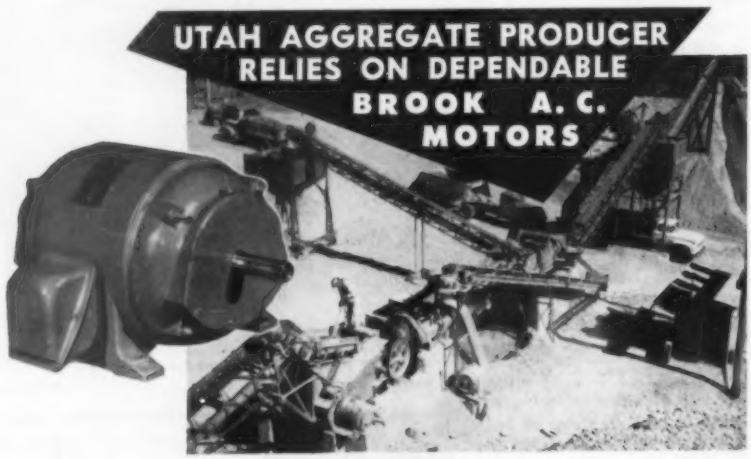
Mr. Hanna joined the Vickers organization in 1951 as sales coordinator in the Chicago office. For the last five years he has held the position of sales application engineer in Chicago.

Purchase of the Rogers Super Tread Tire Company, Yakima, Wash., by the United States Rubber Company, New York, N. Y., has been announced. The Yakima operation will continue its business of retreading giant tires and providing off-the-road tire service to construction contractors. In addition, the Rogers facilities will be used as a training center for personnel of the rubber company and its tire dealers.

E. S. Morgan, former U. S. Rubber truck tire sales manager in the Pacific Northwest, has been appointed general manager of the Rogers operation.

Lloyd J. Tooze was appointed manager of the Detroit district sales office of the Reo Division, The White Motor Company, Lansing, Mich. Mr. Tooze served Reo for the last six years as a salesman at the Detroit branch.

Harold E. Boncutter has been named advertising manager of Hercules Galion Products, Inc., Galion, Ohio.



THIS Utah aggregate producer is assured of dependable power for every operation. Fourteen BROOK MOTORS power crushers, screens, feeders and conveyors. Brook Motors cost them less to install, are tailored to the job and assure lower maintenance costs. There is no finer motor made, as many sand and gravel, and crushed stone plants have found out. Send for catalog.

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3553 W. PETERSON AVE., CHICAGO 45, ILLINOIS

SINCE 1904 BROOK MOTOR CORPORATION

Factory Representatives, Warehouses, Dealers in Principal Cities.

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New advantages for truck owners introduced in all-new Dodge Power Giants for '58

Power, payload, economy and styling features make Dodge 4-way leaders of low-priced 3

Recent introduction of the new '58 Dodge *Power Giants* brings truck owners a series of the most outstanding advances in Dodge truck's 40-year history.

In power, for instance, Dodge offers three new *Power Giant* V-8's that provide up to 234 hp. . . . as much as 24% more than other low-priced makes. These extra-powered engines can take it easy under normal loads . . . keep going longer, too.

Payload capacities are up to an all-time high. Chassis construction features the elimination of excess weight while actually increasing strength. You get as much as ⅓ more payload capacity.

When it comes to economy, Dodge sweeps the field because of its exclusive Power-Dome V-8 engine design that reduces harmful carbon deposits. This improves gas mileage . . . practically eliminates the need for major engine overhauls.

Dodge styling gives truck owners a real prestige bonus. Striking dual headlights, massive new grilles and luxury cabs are exceptional highlights.

All in all, truck owners would be well advised to check into the '58 *Power Giant* line-up before replacing or adding units. These Dodge trucks are definitely four-way leaders of the low-priced three.

DODGE *PowerGiants*

TRU-LAY *flexible* PUSH-PULLS

FOR

Remote Control Jobs

on a great variety of

Construction Equipment

Adaptability to all sorts of mechanical situations explains, in large measure, the wide-spread use of TRU-LAY PUSH-PULLS on tractors and their accessories, power shovels, winches, road graders, road oilers, dump trucks, snow plows, engine-driven pumps, rock crushers and other construction equipment.

These dependable Push-Pulls are used for the remote control of hydraulic and air valves, brakes, clutches, transmissions, throttles, chokes, governors, power take-offs, and many other applications.

TRU-LAY PUSH-PULLS are precision products, not gadgets. They provide positive remote-action whether anchorages are fixed or movable . . . for light loads or loads up to 1,000 lbs. . . . and they are effective over short or long distances, up to 150 feet or more.

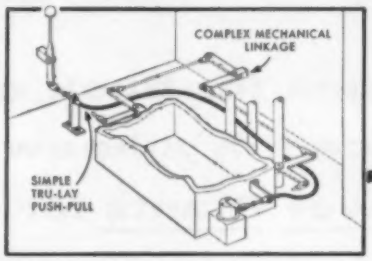
TRU-LAY PUSH-PULLS are dependable and accurate even under the most adverse conditions

They perform effectively under extremes of heat or cold . . . from jet engine temperatures to 70° below zero F. The inner, working member (lubricated for life during assembly) is fully protected by the tough, flexible conduit. Abrasive dusts, dirt and moisture are sealed out. Fittings are cold-swaged to make them integral parts of the control unit. It is a matter of record that we have never heard of a TRU-LAY *flexible* PUSH-PULL wearing out in normal service. Use of these versatile, simple and rugged controls increases ease of operation and means the virtual elimination of maintenance.

Advantages of Tru-Lay Push-Pull flexibility and simplicity are pictured below

Simplicity vs Complexity

Compare the TRU-LAY PUSH-PULL cable in illustration with the mechanical linkage. PUSH-PULLS are simple, have but one moving part, are noiseless and give lifetime service accuracy. Linkages are complex, made of many parts; they wear at many points. Their use brings increased backlash, lost accuracy and vibration rattles.



"Solid as a rod but *flexible* as a wire rope" is a good description of TRU-LAY PUSH-PULL REMOTE CONTROLS. This flexibility makes it possible to snake around obstructions . . . permits the ideal arrangement of all control elements . . . greatly simplifies installation of controls by reducing the number of working parts . . . damps out noise and vibration. Versatile, accurate, adaptable, rugged . . . they are the ideal remote controls for construction equipment.

Our ***DATA FILE*** *will answer your further questions*
Write for a copy without obligation

ACCO

AUTOMOTIVE and AIRCRAFT DIVISION
AMERICAN CHAIN & CABLE

601-K Stephenson Bldg., Detroit 2
2216-K South Garfield Ave., Los Angeles 22 • 929-K Connecticut Ave., Bridgeport 2, Conn.

Enter 150 on card, page 101

THOMAS J. FLEISCHMAN recently assumed his new duties as Western District manager in charge of sales and production for the Multiwall Packaging Division of the St. Regis Paper Company, New York, N. Y. His headquarters are at the Division's San Francisco office.

Mr. Fleischman joined St. Regis in 1950 as a sales representative in the Division's Los Angeles sales territory. He later became manager of the Division, and most recently served as assistant manager of the Western District.

T. J. Fleischman

W. M. Gannon

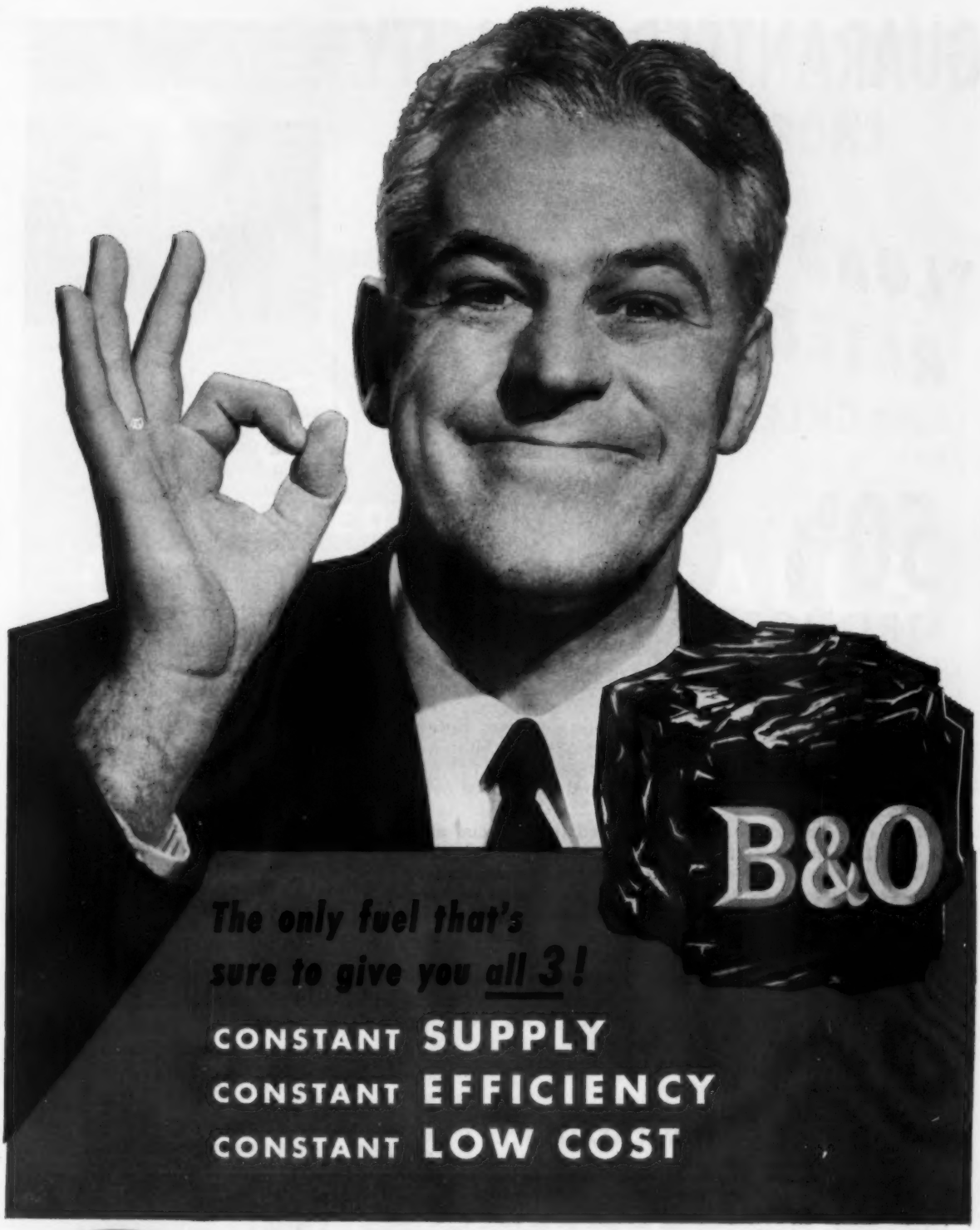
WARREN M. GANNON was appointed sales manager of the Multiwall Packaging Division's Western District, with headquarters at the Los Angeles office. He joined the company in 1952 as a sales representative at Los Angeles, and he has been sales manager of the Division's Los Angeles territory since 1955.

The Construction Machinery Division of the Clark Equipment Company, Benton Harbor, Mich., has appointed three new special field representatives. They are John A. Allsup, who will service the Plain States area; John A. Halleran, who will cover the northwestern United States; and Orland K. Noel, whose territory encompasses the southeastern states.

Western Precipitation Corporation, Los Angeles, Calif., has selected Process and Power, Inc., Memphis, Tenn., as sales agent for its *Multiclone* centrifugal collectors and *Dualaire* filters.

The firm will cover western Tennessee, northern Mississippi, and the entire state of Arkansas.

HOWARD W. BRANDT has been promoted to the position of general manager of the Kalamazoo Division of The New York Air Brake Company, Kalamazoo, Mich. Mr. Brandt recently joined the division as assistant general manager.



B&O **BITUMINOUS COALS FOR EVERY PURPOSE**

Ask our Man! BALTIMORE & OHIO RAILROAD, BALTIMORE 1, MD. *Phone* LExington 9-0400

GUARANTEED CAPACITY
CROSBY-LAUGHLIN

"LOAD RATED" SHACKLES are 50% STRONGER than common shackles!

Size for size, new Crosby-Laughlin* "Load Rated" Shackles are *50% stronger* than common shackles! And you buy guaranteed capacities ranging from ⅓ to 75 tons with the safe working load permanently forged on every shackle.

"Load Rated" Shackles are forged from special alloy steel that has exceptional strength and fatigue resistance. Perfect pin alignment—that distributes stresses equally over the bow—results from drilling pin holes in precision jigs after forming. Heat treated alloy steel pins and bolts in Crosby-Laughlin Shackles are always larger in diameter than the shackle body for additional safety.

Now you can demand—be positive you're getting—*genuine* Crosby-Laughlin "Load Rated" Fittings because they're painted bright RED. It's the quickly recognized symbol of safety *and* the world's most complete line of drop forged fittings for wire rope and chain.

*TRADEMARK

FREE NEW CATALOG . . .

lists over 2000 items . . . lets you order Crosby-Laughlin "Load Rated" Fittings the safe way—by capacities . . . includes detailed specifications and dimensional data . . . available now at construction and industrial equipment distributors and mill supply houses—or write direct.

Stocked and Sold by Leading Distributors

CROSBY-LAUGHLIN *Division*

American Hoist and Derrick Company

FT. WAYNE 1, INDIANA

Enter 152 on card, page 101

The election of J. V. WRIGHT as president of Dorsey Trailers, Elba, Ala., and T. K. DORSEY as executive vice-president has been announced.

J. V. Wright

T. K. Dorsey

HORTON FICK, recently elected vice-president in charge of sales, heads the company's distribution and sales.

Mr. Wright joined Dorsey Trailers in 1912. He has served as sales manager, executive vice-president, and most recently as assistant president.

Mr. Dorsey, who joined the company in 1938, was formerly vice-president in charge of distributor sales.

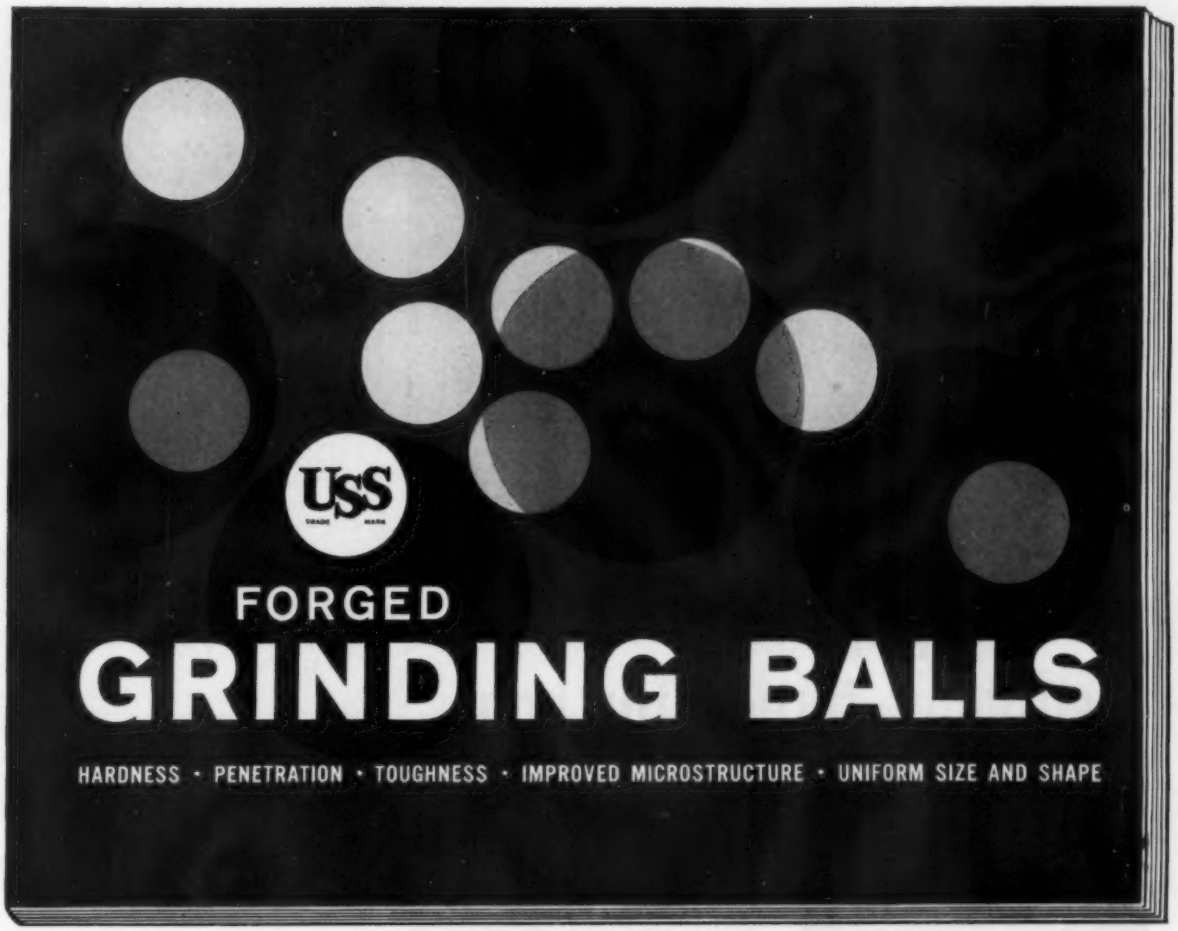
The Carburetor Division of Marvel-Schebler Products Division, Borg-Warner Corporation, Decatur, Ill., is expanding its operations in the field of propane carburetor equipment. The expansion will partly be attained through the acquisition of designs and manufacturing equipment of the Century Gas and Equipment Company, Paramount, Calif.

In conjunction with the propane carburetor development, the appointments of Frank Pilling as manager of LPG operations and Jack Crossman as sales manager of Century Products were announced. Mr. Pilling and Mr. Crossman have been connected with the Century Gas and Equipment Company for several years.

DONALD R. BOYNTON has been appointed special assistant to the sales manager of the mining and construction division of the Gardner-Denver Company, Quincy, Ill.

Mr. Boynton, who has been a field engineer in the Toronto office, has been transferred to the firm's general offices where he will concentrate on sales of mining equipment.

The West Central Sales Division, Harbor Steel & Supply Corporation, Muskegon Heights, Mich., has been named distributor in western Michigan for the Quaker Rubber Division, H. K. Porter Company, Philadelphia, Pa.



New Free Booklet shows why

USS Forged Steel Grinding Balls are your best buy!

THIS NEW 16-PAGE BOOKLET tells how USS Grinding Balls are made and what tests are applied to maintain grinding ball quality. It lists the chemical compositions of both the Carbon-Manganese and Alloy grades of USS Forged Steel Grinding Balls, pictures the modern heat-treating facilities, and charts the results of both Brinell and Rockwell hardness tests obtained from typical grinding balls before shipment from our plant.

This kind of data is only part of the information to be found in our new illustrated booklet describing USS Grinding Balls, their characteristics and manufacture. We will gladly send you a free copy. Just fill in the coupon at right.

United States Steel Corporation
525 William Penn Place, Room 5683
Pittsburgh 30, Pennsylvania

Please send me a copy of
"USS Forged Grinding Balls."

Name .....

Company .....

Address .....

City ..... State .....

USS FORGED GRINDING BALLS

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U N I T E D S T A T E S S T E E L

You pay less for this stronger thread for bags

"SUPER CORDURA" SEWING THREAD reduces bag breakage resulting from rugged handling, because seams are much stronger.

"SUPER CORDURA" can be sewn with smaller needles, preventing material losses caused by sifting.

HIGHLY EFFICIENT "SUPER CORDURA" REG. U. S. PAT. OFF. REDUCES BAG AND CLOSING COSTS

GREATER seam strength, increased sewing efficiency, lower cost—these are the advantages of sewing bags with Du Pont "Super Cordura"* high tenacity rayon.

Because "Super Cordura" is far stronger than ordinary-fiber threads, danger of seam breakage is minimized—drop tests prove it. And because sewing with "Super Cordura" is more efficient, you save money in your closing operations. There are less breaks during closing; one thread does most jobs, reducing thread inventory.

Consider the advantages of bags sewn with Du Pont "Super Cordura" the next time you order multiwalls . . . and order it for use in closing, too.

E. I. du Pont de Nemours & Co. (Inc.), Textile Fibers Department, Wilmington 98, Delaware.

*"Super Cordura" is Du Pont's registered trademark for its high tenacity rayon yarns.

DU PONT
REG. U. S. PAT. OFF.
Better Things for Better Living . . . through Chemistry

THREAD OF "SUPER CORDURA"... easier to sew
... costs less than conventional thread . . . extra-strong

Enter 154 on card, page 101

Announcement has been made of the promotions of two top executives of the Raymond Bag Corporation, Middletown, Ohio, division of the Albemarle Paper Manufacturing Company.

CLARENCE L. MERS, who has been president of the Raymond Division since its incorporation two years ago, has been elected chairman of the board. He joined the original Raymond Bag Company in 1922. When the company was dissolved in 1955, and its assets purchased by Albemarle, he was elected president of the new corporation.

J. R. CLEMENTS, who becomes the new president at Raymond, joined Albemarle in 1952 as Midwestern District manager of the firm's Multiwall Division. In 1953 he became sales manager of the Division, and was elected vice-president in charge of sales when the new Raymond corporation was formed in 1955.

Harnischfeger Corporation, Milwaukee, Wis., has acquired the General Electric Company designs for rotating type welding machines using both gas drives and electric motors. General Electric had through the years developed these designs incorporating the latest refinements in their equipment prior to last July when they ceased operations in this field.

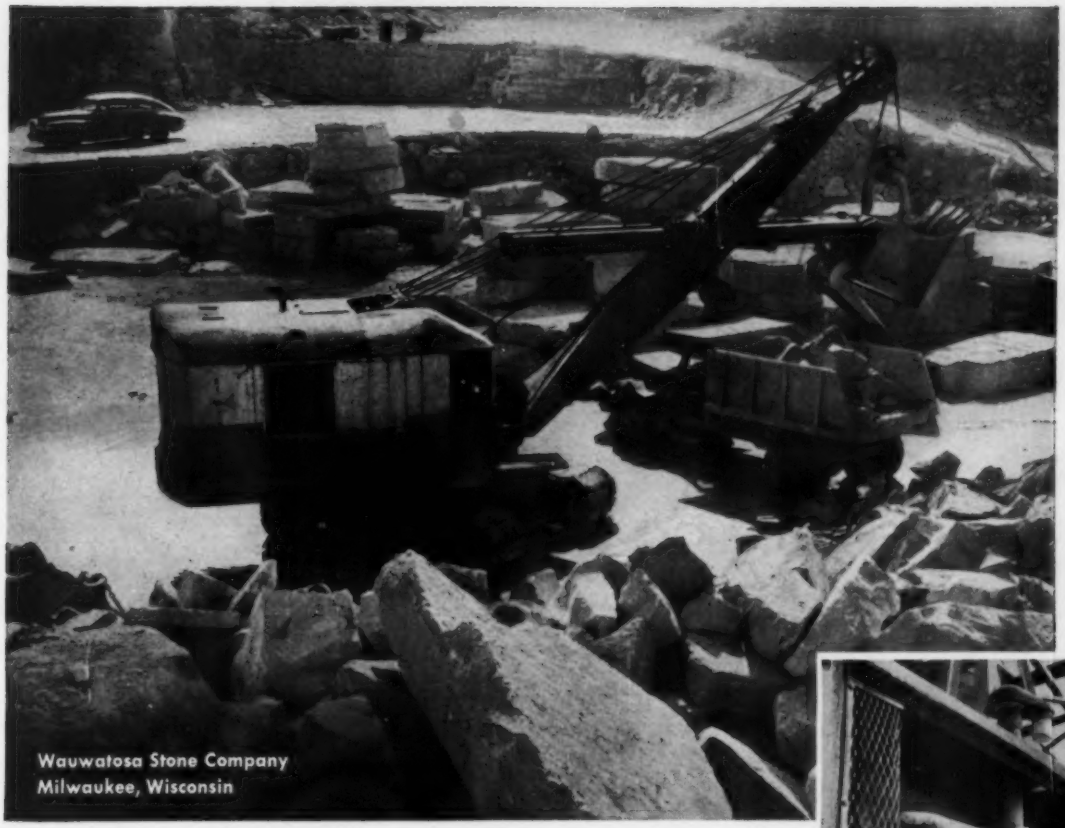
Raybestos-Manhattan, Inc., Passaic, N. J., has named S. R. ZIMMERMAN JR. general manager of its U. S. Asbestos-Grey Rock Division, at Manheim, Pa.

Mr. Zimmerman has been with the Division for the last 25 years, recently as assistant general manager. He is also a vice-president and director of Raybestos-Manhattan.

The offices of Ehrsam-Pacific, Inc., subsidiary West Coast sales firm of The J. B. Ehrsam & Sons Manufacturing Company, Enterprise, Kans., are now located in San Francisco, Calif., at 171 Second St.

Robert C. Fyfe, who was in charge of the former offices at Riverside, will continue to head the new San Francisco office.

Directors of the American Pulley Company, Philadelphia, Pa., have ratified an agreement for the acquisition of the business and assets of the Hubbard Spool Company, Garrett, Ind. Hubbard will operate as a division of The American Pulley Co.



Wauwatosa Stone Company
Milwaukee, Wisconsin

OVER 3 YEARS AT THE ROCK PILE— ENGINE ABSOLUTELY UNTOUCHED!

Another record for Cities Service C-300 Motor Oil

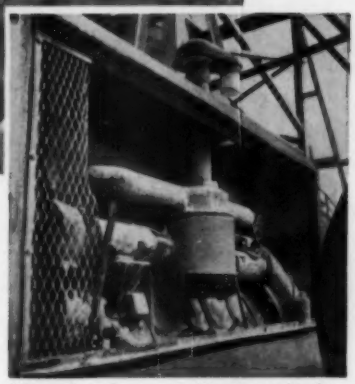
Eight hours a day, six days a week for over three years, this shovel of Wauwatosa Stone Company has been hard at work.

Yet, lubricated by Cities Service C-300 Motor Oil, it has required absolutely no engine work during this entire period!

And it's not the only piece of Wauwatosa equipment with such an outstanding performance record. For, using Cities Service C-300 Motor Oil, **another shovel has gone over seven years without major overhaul!** And the diesel which operates the gyro crusher has already put in two years itself! All this under typically dusty quarry conditions.

"It's not only the motor oil that gives us terrific performance in this work," says Supt. Frank Brezonick. "We're also getting excellent service from Trojan H-2 Grease, Cities Service Diesel Fuel, and our other Cities Service products. All are doing a great job."

In quarry after quarry, you'll hear similar reports about Cities Service fuels and lubricants . . . but more important is what they can do for you. Get the facts from a Cities Service Lubrication Engineer. Or write: Cities Service Oil Co., Sixty Wall Tower, New York 5, N. Y.



More than 2 years without overhaul is the record logged by this diesel using Cities Service C-300 Motor Oil. None is anticipated for many months to come.

Caught in the crush of work . . . stone is dumped into primary crusher. In addition to crushed stone and gravel, Wauwatosa produces riprap for breakwaters and buildings.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Enter 155 on card, page 101

Marion Power Shovel Company, Marion, Ohio, has named MIKE GELLER as assistant sales manager and BOB FALCK as western regional sales manager.

In his new position, Mr. Geller will assist in the administration of the Marion sales, service, and parts departments, and the sales of small machines ranging in size from ¾ to 4 cu. yd.

As western regional manager, Mr. Falck will represent Marion in the states of California, Nevada, Utah, and Arizona, and parts of New Mexico and Idaho.

WALTER B. SMITH, formerly St. Louis, Mo., branch manager for the Thor Power Tool Company, Chicago, Ill., has been named manager of the firm's Milwaukee, Wis., branch, replacing Clarence B. Bergren, who recently was appointed manager of Thor electric and Speed-Tool sales. Theodore E. Vocker, previously a service engineer, succeeds Mr. Smith as St. Louis branch manager.

Five additional promotions to posts as district sales managers have also been announced.

Harry L. Groves has been appointed to the Houston, Tex., branch office, which covers Texas, except for the El Paso area, eastern Louisiana, and part of southern Arkansas. Martin A. Bertram, was named to head the Cincinnati, Ohio, branch, which includes southwestern Ohio and the eastern half of Kentucky.

Samuel P. Gartland was promoted to the Boston, Mass., branch, for the territory of Massachusetts, New Hampshire, Maine, and Rhode Island. Thomas J. Murphy was named manager of the Buffalo, N. Y., branch, which covers western New York State, and northern Pennsylvania. James Q. Golden is sales manager of the Atlanta, Ga., branch for the territory of Florida, Georgia, South Carolina, and part of western North Carolina.

ROBERT W. HOKE JR. has been named district manager of the Toronto office of the Gardner-Denver Company, Quincy, Ill., succeeding ROBERT H. GANZ, who has been made head of the Gardner-Denver district office in Teterboro, N. J.

Mr. Hoke comes to his new position from Detroit, Mich., where he served as an industrial specialist for the company. He joined Gardner-Denver in 1948, and served as head of the Detroit office. In 1955, he became an industrial specialist.

C. G. SEARS has been appointed sales manager for Pioneer Engineering, Division of Poor & Company, Minneapolis, Minn.

Mr. Sears joined Pioneer's sales force in 1945. For several years he covered the northeastern section of the country, and most recently was district sales engineer in Ontario, Michigan, Wisconsin, Indiana, and northern Illinois.

C. G. Sears

J. G. Rehm

JOHN G. REHM has been appointed sales engineer for dust, fume, and fly ash equipment in the Pittsburgh office of the Western Precipitation Corp., Los Angeles, Calif. Mr. Rehm will specialize in power plants, cement plants, and a wide range of applications other than those in the steel industry. He will serve the western Pennsylvania, eastern Ohio, and West Virginia territories.

Mr. Rehm was formerly sales engineer in the Precipitator Sales Division in the Los Angeles office.

LEONARD Z. BUDZEN has been named manager of mining sales in the Metallurgical Products Department of the General Electric Company, Detroit, Mich. Mr. Budzen was formerly a mining sales specialist.

GERALD C. NALON has been appointed a sales representative for the Mining Sales Section of G-E's Metallurgical Products Department. His duties include the sale of such mining products as hard metal for percussive and rotary applications.

WILLIAM W. GILBERT has been appointed manager of the Detroit district sales office of The Babcock & Wilcox Company's Boiler Division. Mr. Gilbert succeeds Arthur R. Waugaman, who retired after 22 years of service in the Detroit office.

FRED W. ELLIOTT has been elected a vice-president of the H. K. Porter Company, Inc., New York, N. Y. Mr. Elliott previously had been assistant to the president

Appointment of the Jeff Hunt Machinery Company, Columbia, S. C., as distributor in South Carolina for *Lima* shovels, cranes, draglines, and pull shovels and the *Lima* Roadpacker vibratory compactor, has been announced by the Baldwin-Lima-Hamilton Corporation, Construction Equipment Division, Lima, Ohio.

JOHN M. SHEEHAN JR. has been promoted to the post of assistant advertising manager of the Fuller Company, Catasauqua, Pa. Mr. Sheehan joined Fuller in 1957 as an advertising assistant.

GUY J. COFFEY, president of the Chicago Pneumatic Tool Company, has been elected president of the Diesel Engine Manufacturers Association. Mr. Coffey, an association vice-president and director, succeeds WALTER A. RENTSCHLER, vice-president and general manager of the Hamilton Div., Baldwin-Lima-Hamilton Corp., Hamilton, Ohio.

Newly-elected vice-presidents of the Association are: William E. Butts, president, General Metals Corp., San Francisco, Calif.; and John N. MacKendrick, president, Clark Bros. Co., Olean, N. Y. Robert H. Morse Jr., president, Fairbanks, Morse & Co., Chicago, Ill., was re-elected treasurer of the Association.

The establishment of a Canadian Division by Wheelabrator Corporation, Mishawaka, Ind., has been announced. The new plant, located in Scarborough, (Metropolitan Toronto), Ont., houses the Canadian division sales and general offices and warehouse storage and shipping for Wheelabrator airless blast cleaning equipment parts, dust collector parts and steel abrasives. Manufacturing and assembly facilities will gradually be available for the production of Wheelabrator equipment and Dustube dust collection equipment.

Robert A. Campbell, Canadian district manager for Wheelabrator since 1946, is general manager of the division.

Harnischfeger International Corporation, a wholly-owned subsidiary of Harnischfeger Corporation, Milwaukee, Wis., announces its association with Equipamentos Industriais Villares S. A., Sao Paulo, Brazil.

This association provides for the Brazilian manufacture of P&H power shovels and truck cranes in a complete range of sizes from ½- through 2½-cu. yd. capacity.

OFF THE SHELF–

NO REBORING–

NO KEYSEATING–

NO WAITING!

TAPER-LOCK SPROCKETS
SINGLE AND DOUBLE STRAND!

NOW Taper-Lock *Double* Strand Sprockets are available—from stock—ready for the shaft without re-machining!

They offer all the advantages of Taper-Lock mounting. Easy on! Easy off! Precision machined at the factory, they come to you with accurate, concentric bores —insuring full contact between hub and shaft. Taper-Lock grips with the firmness of a shrunk-on fit!

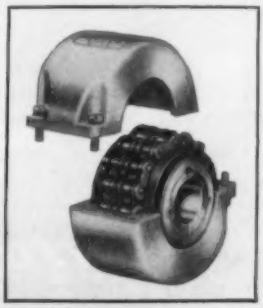
There is no flange, no collar, no protruding part. Flush design means *safety*... If the sprocket becomes worn, you replace only the tooth part. The bushing is used again and again. And Taper-Lock bushings are interchangeable in Dodge Taper-Lock Sheaves, Couplings and Conveyor Pulleys!

Taper-Lock Sprockets and Dodge Roller Chain (made to ASA standards) are stocked by Dodge distributors. Single Strand sizes range from No. 40 to No. 160, up to 112 teeth; Double Strand from No. 40-2 to 80-2, up to 102 teeth. Write for Bulletin A-644 containing selection, installation and maintenance data.

DODGE MANUFACTURING CORPORATION
4000 Union Street, Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new methods. Look for his name under "Power Transmission Machinery" in your classified phone book, or write us.



TAPER-LOCK CHAIN COUPLINGS

Accommodates common minor shaft misalignments. Provides strong, compact coupling. Available with covers, for appearance, safety, dirt protection and lubrication — which increases coupling life.

SEE US AT THE CONRAD HILTON NSGA EXHIBIT . . . BOOTH 61

ROBERT E. LUEBKE was appointed sales manager for the Mining, Crusher, and Process Machinery Division of the Nordberg Manufacturing Company, Milwaukee, Wis., assigned to the Cement Industry Machinery branch.

R. E. Luebke

Mr. Luebke's new duties include special machinery design, cement plant machinery applications, and direct sales.

A. V. COSSENS has been promoted from assistant sales manager of the Koehring Division, Milwaukee, Wis., to the newly-created position of product manager. Mr. Cossens will administer sales programs related to the introduction of new products.

Appointment of H. DOUGLAS ROWE as director—manufacturing at Cummins Engine Company, Columbus, Ind., was announced. Mr. Rowe formerly was general manager of the Ford Motor Company's Brookpark Road engine plant in Cleveland, Ohio.

R. P. HALL, former branch manager of the Atlanta, Ga., office of The Timken Roller Bearing Company, Canton, Ohio, has been appointed assistant manager of bearing sales of the firm's Service-Sales Division.

R. P. Hall

H. C. Renner

H. C. RENNER has been made branch manager of the Atlanta office, succeeding Mr. Hall. Mr. Renner was formerly a salesman in the Tampa, Fla., area, covering the southern territory.

R. E. MORRIS, manager of industrial sales for the Industries Group in the Washington, D. C., office of the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has been named manager of the Group's St. Louis district, succeeding J. C. Lovelace, who has resigned.

ROBERT G. CADY, sales manager and treasurer of the Ajax Flexible Coupling Company, Inc., Westfield, N. Y., died recently following a brief illness. Mr. Cady had been associated with Ajax for 27 years.

Appointment of JOHN A. WETTERGREEN as manufacturing vice-president and general works manager of the Marion Power Shovel Company, Marion, Ohio, has been announced.

Trabon Engineering Corporation, Solon, Ohio, has appointed the J. N. Fauver Company, Inc., Cincinnati, Ohio, as its distributor for Trabon centralized lubrication systems in the southern Ohio, Indiana, western Kentucky, and the Ohio River Valley areas.

J. W. HARDESTY has been appointed general manager — sales of the Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

NOW a Cone-Type Rock Bit is included in the HAWTHORNE "*Blue Demon*" LINE!

a COMPLETE LINE of bits for all soft-medium-hard formation drilling

A Cone-Type Rock Bit . . . for Oil and Minerals Exploration and Quarry Blast Hole Drilling . . . is now included in the Hawthorne "Blue Demon" *All-Formation* drill bit line.

Designed for drilling harder formations than are regularly recommended with the patented "Blue Demon" Replaceable Blade Bits, the Cone-Type Rock Bit is available from authorized Hawthorne dealers in 3⅞", 4¼", 4½", 4¾" and 5⅝" sizes.

Consistently priced, wherever you go, ask for Hawthorne Bits for all your drilling requirements.

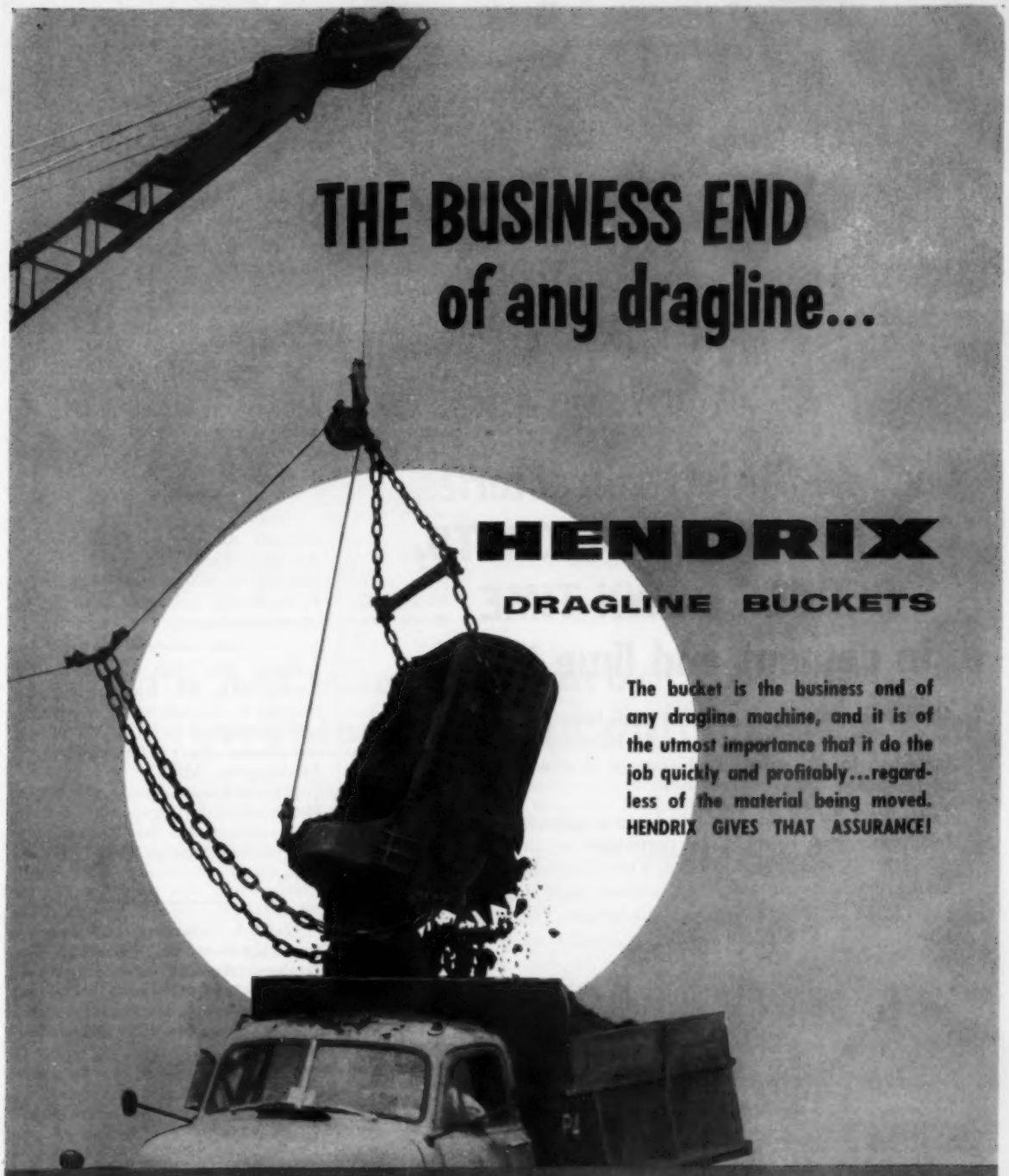
WRITE FOR ILLUSTRATED CATALOG

HERB J. HAWTHORNE INC.

P. O. Box 7268 • Houston 8, Texas • Cable Address: HAWBIT

Enter 158 on card, page 101

THE BUSINESS END of any dragline...



HENDRIX
DRAGLINE BUCKETS

The bucket is the business end of any dragline machine, and it is of the utmost importance that it do the job quickly and profitably...regardless of the material being moved. HENDRIX GIVES THAT ASSURANCE!

"A Type for Every Digging Purpose"...
¼ to 40 Cubic Yards-Perforated or Solid

HENDRIX MANUFACTURING COMPANY, Inc.
MANSFIELD, LOUISIANA

Hendrix Lightweight DRAGLINE BUCKETS

Rotary Cement Kiln lined with Laclede-Christy refractories.

Laclede-Christy refractories CUT MAINTENANCE COSTS, REDUCE DOWN TIME in cement and lime kilns

Operating practice in cement and lime plants varies widely. A combination of the right refractories, properly installed, means substantial savings in down time and maintenance costs.

Laclede-Christy kiln liners and other refractories have been developed to meet the particular requirements of the cement and lime industry. Your Laclede representative can provide valuable product and engineering experience in helping you get the longest lining life at lowest cost. Call him. Or, write to *Laclede-Christy Works, Refractories Division, H. K. Porter Company, Inc., St. Louis 10, Mo. In Canada, H. K. Porter Company (Canada) Ltd., Guelph, Ontario.*

LACLEDE 70
(70% Alumina)
For hot zones of Rotary Cement Kilns; calcining zones of Lime Sludge Kilns, Dolomite Kilns, and Magnesite Kilns.

PEERLAC
(60% Alumina)
Intermediate zones of Rotary Cement Kilns, calcining zones of Lime Sludge Kilns, burning zones of Lime Kilns.

SPECIAL SPALLAC
(Super Duty, High Burn)

WALLAC
(High Duty, Stiff Mud)

SPALLAC
(Super Duty)
Intermediate zones, Rotary Cement Kilns.

FIRMCAST
(Extra strength castable, abrasion-resistant, for chain sections of Rotary Cement Kilns)

SUPER PLASTIC
(for Kiln Firing Hoods)

KING
(High Duty, Dry Press)

LACLEDE ARCHES
(for Clinker Coolers)

H. K. PORTER COMPANY, INC.
REFRACTORIES DIVISION

Enter 160 on card, page 101

On December 1, 1957, new plant facilities of the Stephens-Adamson Manufacturing Company, Aurora, Ill., went into full production at Clarksdale, Miss. The completely modern plant fabricates component parts for conveyor systems which are also produced at the firm's Aurora, Ill., manufacturing division.

The Clarksdale division will supply Stephens-Adamson's southern market, as well as supplement distribution of products in other areas. In addition to the Aurora and Clarksdale plants, the company presently operates manufacturing divisions in Los Angeles, Calif., and Belleville, Ont.

Management of the new division is headed by D. R. Dolan, who joined the organization in 1951. He served as regional branch office manager of the Raleigh, N. C. regional branch office for three years.

JOHN J. MCDERMOTT, formerly assistant manager of production of the Barberton, Ohio, works of The Babcock & Wilcox Company, New York, N. Y., has been named production manager.

Bemis Bro. Bag Company, St. Louis, Mo., has appointed DR. ROBERT C. KUDER to the newly-created position of technical director of the Bemis Research Laboratory, Minneapolis, Minn.

Prior to his appointment by Bemis, Dr. Kuder was supervisor of polymer research for the Barrett Division, Allied Chemical and Dye Corporation.

DAVID S. BINDER, of the Mann Engineering Company, Pittsburgh, Pa., has been transferred from Pittsburgh, to Cleveland, Ohio, to serve the firm's customers in the Cleveland, Columbus, and northwestern Ohio, area.

Prior to joining Mann Engineering Co., Mr. Binder served as sales engineer for the U. S. Gypsum Company.

GEORGE A. WATERMAN has joined Olin Mathieson Chemical Corporation, New York, N. Y., as director of product sales and engineering for Olin Aluminum. He had been manager, extrusion sales, for Kaiser Aluminum and Chemical Sales, Inc., Chicago, Ill.

Mr. Waterman will have direct responsibility for the direction and co-ordination of product and industrial sales, and engineering service.

This shows a portion of one of the year's outstanding conveyor jobs . . . Consumer's Company, Crystal Lake, Illinois.

It's not true that Barber-Greene invented the belt conveyor

. . . but it is true that Barber-Greene introduced the greatest advance in belt conveyors since their invention —*standardization.*

Before Barber-Greene entered the field in 1916, belt conveyors were economical on paper—costly to build. Most installations were tailor-made, involving slow single-unit production . . . expensive field engineering . . . complicated assembly.

Then Barber-Greene developed a unique system of standardized conveyor components that quickly outdated ordinary methods of erection, operation and maintenance. Soon standardized conveyors were known for:

Faster delivery. Packaged units come from dealer stock or are immediately available from the factory.

Low-cost erection. Conveyors get into operation sooner with big savings in engineering costs.

Unmatched flexibility. Interchangeable parts simplify lengthening or shortening of conveyors to meet changing needs.

Today, standardized components are practical for installations of nearly every length, width and capacity. Wherever used, they give a new meaning to conveyor economy, utility and flexibility.

Drives, take-ups and similar units are completely assembled, aligned and adjusted by experts at the factory to assure trouble-free operation.

Write for literature or contact our conveyor division for details on your conveyor problem.

56-39PE

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

hard and tough to the core...

The alloying, forging and heat-treating by Sheffield gives MOLY-COP Balls the right hardness and quality for the long, economical grind. It's why MOLY-COP Balls are still THE STANDARD OF COMPARISON AROUND THE WORLD

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ARMCO®

MOLY-COP

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COPPER-MOLYBDENUM-ALLOY

Grinding Balls

SHEFFIELD DIVISION

ARMCO STEEL CORPORATION

SHEFFIELD PLANTS: HOUSTON • KANSAS CITY • TULSA

EXPORT REPRESENTATIVES

THE ARMCO INTERNATIONAL CORPORATION, MIDDLETOWN, OHIO

WEMCO MOBIL-MILL Heavy Media Separation Plant

Save $1.00 or more per yard of concrete

where aggregate requires HMS treatment

If you *sell* aggregate: WEMCO **HMS** will give you a better market, especially where specifications are tight.

If you *buy* aggregate: WEMCO **HMS** will lower your cost of producing better concrete by more than $1.00 per yard.

If you *specify* aggregate: WEMCO **HMS** can give concrete of greater strength and durability, as proved by state tests.

Below are the facts – composite figures based on actual operating results – demonstrating a saving of over a dollar per yard of finished concrete, using WEMCO **HMS** treated aggregate. Operating costs for WEMCO **HMS** are low – only a fraction of the actual dollars-and-cents benefits you'll obtain. Check with your WEMCO representative today, or write for details.

Untreated Aggregate	Cement (6-bag mix required for durability) **$6.00** Pozzolan (required by most state specifications) **$1.08** Total concrete cost per yard **$7.08**
WEMCO HMS Aggregate	Cement (5-bag mix provides sufficient durability) **$5.00** Pozzolan (less is needed to meet specifications) **$ .91** Total concrete cost per yard **$5.91**
Saving	– in cement and pozzolan alone – per yard **$1.17**

WEMCO

WESTERN MACHINERY COMPANY
650 FIFTH STREET
SAN FRANCISCO 7, CALIFORNIA

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These Industry Leaders

"CONTAINERIZE"

Scrap, Waste & Rubbish AS IT ACCUMULATES...

Armour & Company
Douglas Aircraft Corp.
Dow Chemical
E. I. Du Pont
Ford Motor Company
General Electric Corp.
General Motors Corp.
Goodyear
Gulf Oil Company
Ingersoll-Rand Co.
Johns-Manville
Republic Steel
Reynolds Metals
Standard Oil Company
U. S. Gypsum
U. S. Rubber Company
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Westinghouse

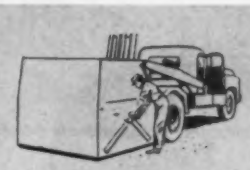
One-Man Dempster-Dumpster Cuts Costs

Enclosed, temporary storage of waste is the key to plant cleanliness and low-cost disposal. Big, clean Dempster-Dumpster Containers, placed at major inside and outside accumulation points, "Containerize" waste and rubbish *as it generates*. Costly rehandling is eliminated; one man and one truck-mounted Dempster-Dumpster dispose of all waste from your plant . . . picking up, hauling and dumping Containers on a planned shuttle schedule. You may own this low-investment System or your local Dempster-Dumpster Contract Hauler will furnish the Containers and empty them for a nominal fee.

FREE BOOKLET "How to Cut Waste Disposal Costs"

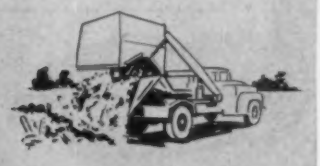
Name of Dempster-Dumpster Contract Hauler furnished on request.

Dept. PQ-2 DEMPSTER BROTHERS, Knoxville 17, Tenn.



CONTAINERIZED WASTE IS PICKED UP . . .

HAULED . . .



. . . AND DUMPED

Dept. PQ-2 , Dempster Brothers, Knoxville 17, Tenn.
Please send without obligation your new booklet, "How to Cut Waste Disposal Costs."

Name..... Title.....

Firm.....

Address.....

City..... State.....

THE DEMPSTER DUMPSTER® SYSTEM

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for a BIRDSBORO-BUCHANAN Giant DEEP-FRAME Primary Jaw Crusher

● Eight cubic yards of hard rock can be crushed with each bite of this 66″ x 84″ all-steel Birdsboro-Buchanan crusher. The special deeper-frame design provides the necessary depth for maximum closure to increase the amount of reduction in primary crushing. Set for 10½″ discharge, owners of this Birdsboro model get 1,000 tons or more per hour. Large volume tonnage for lower costs is not confined to mammoth models like this one. Many of the same benefits are available in smaller deep-frame crushers. Call in your Birdsboro engineer for help in reducing your crushing costs. *Main Office, Engineering Department and Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.

World-Wide Agent Representation. Contact home office for nearest representative. *Canadian Representative & Manufacturer:* John Inglis Co., Ltd., Toronto, Canada.

Deep-frame primary jaw crushers are built in sizes ranging from 24″ x 36″ to 66″ x 84″.

CR-12-56R

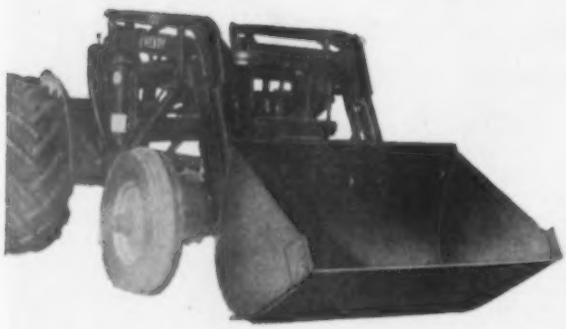
BIRDSBORO
STEEL FOUNDRY AND MACHINE CO.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel

All New and Great for '58

HENRY

700 AND 800 TRACTOR SHOVELS WITH SELF-LEVELING BUCKET



- LATEST ENGINEERING DESIGN
- SOLID STEEL LIFT ARMS
- MAXIMUM PERFORMANCE UNDER HEAVY-DUTY OPERATION
- MORE BUCKET ROLLBACK
- GREATER DUMPING HEIGHT
- CONTINUOUS OPERATING PUMP
- FLOAT POSITION IN CONTROL VALVE
- BUCKET PITCH INDICATOR
- MAXIMUM DUMP ANGLE
- LARGE CAPACITY REPLACEABLE FILTER

MAKES FULL USE OF THE FULL LINE OF ATTACHMENTS

Lifting Capacity	2000 lbs.
Breakaway Capacity	3000 lbs.
Loading Height (45° dump)	8'6"
Bucket Rollback	30°
Maximum Dump Angle	58°
Cylinders:	
Lift	2½" bore, 1¾" diam. chrome rod
Bucket	2½" bore, 1½" diam. chrome rod

HENRY MANUFACTURING COMPANY, INC. TOPEKA, KANSAS

"YOU CAN DO IT BETTER WITH A HENRY"

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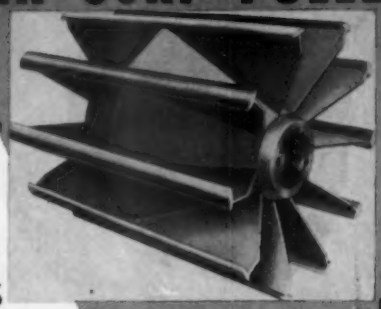
STOP MISALIGNMENT

BUY VAN GORP PULLEYS

Dodge



Taper Lock

Free Catalog on Request

SIZES

8" to 60"

Van Gorp Self Cleaning Pulleys are designed to stop costly, troublesome problems. Individual wing construction insures automatic positive cleaning action because rotation of the pulley discharges all foreign material to the sides of the pulley. No more abrasive belt wear! conveyor belts are always properly aligned!

Rugged, all welded steel construction makes Van Gorp Pulleys durable and capable of top performance even under the most severe working conditions.

BIG PULLEYS — up to 3 feet in diameter and 5½ feet in face width and a 10-inch maximum bore. Be wise, specify Van Gorp Self Cleaning Pulleys. *Write for FREE Catalog.*

Van Gorp Mfg. Inc.

Box 123, Pella, Iowa — Telephone MAyfair 8-2140

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Meet a Packaging Problem -Solver

Years of experience in the Multiwall field, backed by vast paper resources and extensive manufacturing facilities, assures you a *practical* answer to your packaging problems. Let a Raymond Representative show you how with a Raymond Multiwall!

Raymond BAG CORPORATION

Division of Albemarle Paper Mfg. Co.

MIDDLETOWN, OHIO • RICHMOND, VIRGINIA

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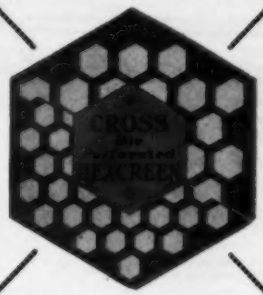
Cross HEXCREEN marks the apex of sizing efficiency

CROSS Hexcreen provides superior sizing performance with high accuracy and big output. Hexcreen's one-piece rigid units feature low installation cost—less blinding—maximum rigidity and long life.

Look for this stamp on all "Cross" Products

C+

the sign of PLUS QUALITY for PLUS PERFORMANCE.



Write TODAY for complete information

CROSS Perforated Steel Segments, Sections, Decks and Parts for VIBRATING — SHAKING — REVOLVING SCREENS. *Services of Cross Field Engineer and Technical Data on Request.*

CROSS ENGINEERING COMPANY
Established 1901
Manufacturing Plant & Offices: CARBONDALE, PENNSYLVANIA
Service Agencies in Principal Cities: NEW YORK: 101 Park Avenue; MIAMI: Dupont Plaza Center

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SYNTRON
TEST SIEVE SHAKERS
for faster, more accurate analysis of industrial materials

NEW, IMPROVED

The new, improved SYNTRON Test Sieve Shakers provide quick accurate separation of industrial materials with more positive control of components.

Featured improvements

- Larger, more powerful electromagnetic drive
- Rheostat voltage control
- Reset timer for accurate time testing
- Voltmeter to obtain comparable tests under identical conditions
- Holds six standard 8-inch test sieves and bottom pan
- Operates from 115 volt, 60 cycle a-c.

Write for complete information on SYNTRON Test Sieve Shakers — TS0258

SYNTRON COMPANY
385 Carson Avenue, Homer City, Penna.

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DREDGE SLEEVE CLAMPS
Sturdy • Practical • Dependable • Economical

Furnishes a positive seal for round flexible joints. Used by leading dredging and hydraulic sand-and-gravel operators, and the U.S. Engineering Corps. This Multi-use chain sleeve clamp is easy to apply... positive in action. Write for illustrated folder, today.

THE BLACK BROTHERS CO., INC.
9th Ave. at 4th, Mendota, Illinois

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AJAX Flexible couplings

Ajax Series D-100 Dihedral Couplings handle shaft misalignment, — offset, angular and end float up to 12°. Patented tooth design permits far less tooth clearance and provides more tooth area in contact under misalignment than with any other shaped tooth. No end-of-tooth wear, even under maximum misalignment.

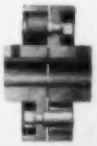
D100-12°

Ajax Series D-3000 Dihedral Couplings handle shaft misalignment up to 3°, — yet cost no more than ordinary gear type couplings that have far less misalignment capacity. Specially designed gear teeth distribute load over center of teeth, point of greatest strength. Johns-Manville "Clipper" Seals keep lubricant in and foreign matter out.

D3000-3°

Ajax Rubber-Bronze Bushed Couplings are built in a wide range of sizes and capacities with standard couplings made of forged steel or cast semi-steel. Flanges can be machined from aluminum, bronze and other metals, and can be chrome, cadmium or silver plated for protection from adverse atmospheric conditions. *Write for catalogs today.*

RUBBER-BRONZE BUSHED



AJAX FLEXIBLE COUPLING CO. INC.
WESTFIELD, NEW YORK

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BETTER WELDS | SMOOTHER, EASIER APPLICATIONS | ADDITIONAL SAVINGS | BETTER WEAR RESISTANCE

A royal proclamation by

ENGINEERED TOUGHNESS

REXARC
"KING OF THE ARC"

presenting:

SIX ELECTRODES
TO COVER 95% OR MORE OF
YOUR BUILDUP AND HARD-FACING REQUIREMENTS

EACH IN FOUR SIZES

Contact your nearest distributor, or the factory direct, for free 20-page manual

METALLIC COATING BECOMES A PART OF THE DEPOSIT!

MANUFACTURED BY
The SIGHT FEED GENERATOR COMPANY

WEST ALEXANDRIA
OHIO, U.S.A.

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Announcing . . .

THE NEW PORTLAND CEMENT PLANT MAP

The new Portland Cement Plant Map so many of you have been waiting for is now available and ready for distribution.

It is 34 inches high by 40 inches wide and printed on sturdy 60 pound stock, making it ideal for hanging on an office wall or placing under the glass top of your desk. Each producing plant is listed alphabetically, by state and city. This list covers the plants in the United States, Canada, Mexico, Cuba and Puerto Rico. These plants are also indicated on the geographical map. Also included in the information on each plant is the plant's producing capacity at the end of 1957, and its estimated capacity at the end of 1958, if the plant is planning to expand; the process used to manufacture each plant's cement . . . wet or dry; and the brand names of the cement each plant produces. New plants under construction and grinding plants also appear in this group.

In addition, portland cement distributing plants located in the United States, Canada, Mexico, Cuba and Puerto Rico appear in a separate list and are also shown on the geographical map.

These maps may be purchased for the following quantity prices:

NUMBER OF MAPS	PRICE
1 — 10	$1.00 each
11 — 25	.75 "
over 25	.50 "

Just tell us the number of maps you want by submitting your request on your regular company letterhead. You can either send along your check or request to be billed later; either way is suitable to us.

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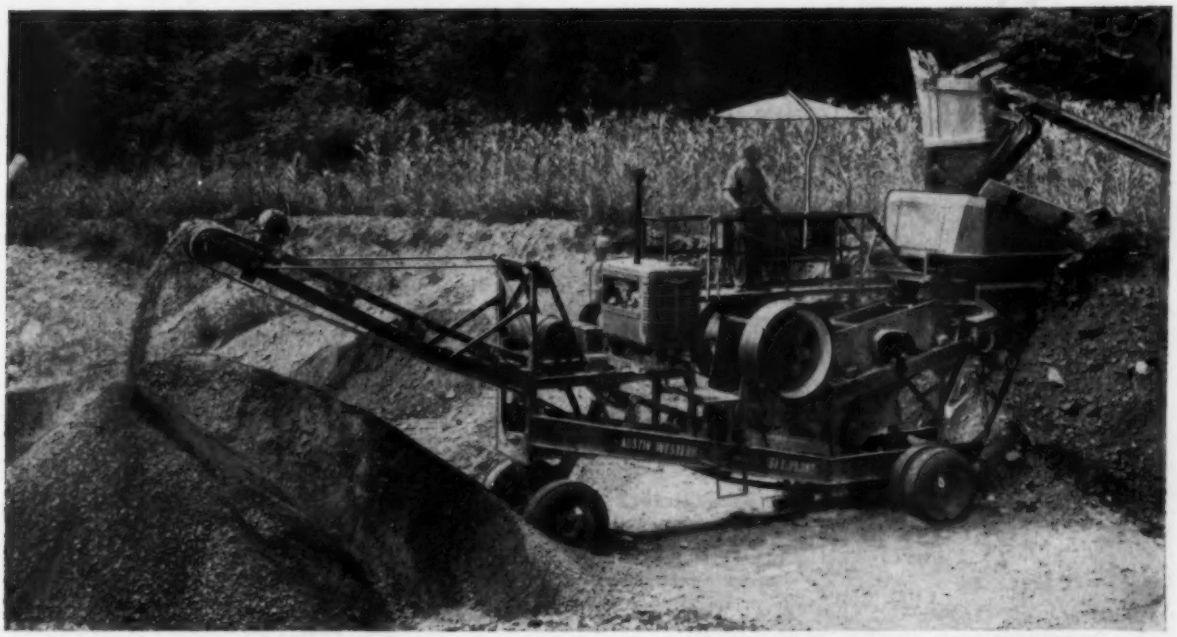


Lima Austin-Western 61-E portable diesel-electric plant equipped with 10" x 24" Roller Bearing Jaw Crusher and 2' x 6' double deck Gyrating Screen. A complete single-pass crushing and screening unit that can move in and out of a job in a minimum of time.

LIMA AUSTIN-WESTERN CRUSHERS

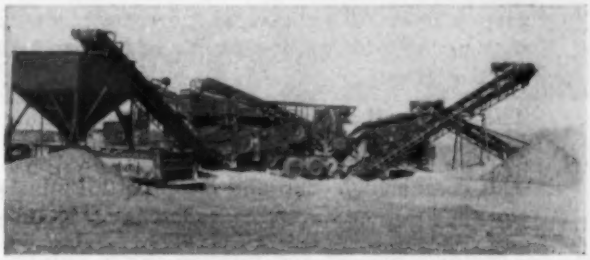
. . . for high output at low cost

There's a Lima Austin-Western crusher engineered for every job. In all cases, the components are accurately balanced to give high output with minimum maintenance. Apron or Reciprocating Feeders control the flow of material, eliminating overloads, choking and surging. Centralized power plants, anti-friction bearings, and fewer shafts, belts and gears keep operating costs low.

Portable plants are designed for fast moves and easy setups. Weight is distributed to meet most state highway limitations. One-man operation reduces the cost per ton. Their wide range of adjustment makes it simple to meet rigid specifications.

The Lima Austin-Western line includes jaw and roll crushers in many sizes, plus matching screens, elevators, conveyors and bins. Call on your nearest distributor for full information. Or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

Lima Austin-Western stationary crushing plant producing washed sand and three sizes of specification material.



Lima Austin-Western 101-S closed circuit portable crushing and screening plant; a high-output unit delivering sand and roadbase material in two sizes.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA AUSTIN-WESTERN Crushing, Screening and Washing Equipment

BALDWIN · LIMA · HAMILTON

CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO 581

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Hendrick, Pioneer Perforator of special quality steels for over 81 years, can really cure your vibrating screen problems! Hendrick's wide experience in selecting and specifying the best analysis of steel for the aggregates industry plus their unlimited experience in perforating plate gives you a combination **1+1=2** that can't be beaten! Hendrick Perforated Plate not only stands up longer, but affords more accurate sizing. No other screening medium can compare to it for maintained uniformity of mesh, for non-blinding clearance and for long trouble-free life. For details write to Hendrick, today!

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel Flooring—Shur-Bite Treads • Armorgrids • Hydro Dehazers • Petrochemical Column Internals

Hendrick MANUFACTURING COMPANY
39 DUNDAFF STREET CARBONDALE, PA.

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It's Here!

BRAND **NEW**

LIGHTWEIGHT AGGREGATE PLANT MAP

Our newest combination map and listing is a *must* to anyone interested in the lightweight aggregate field. All lightweight aggregate plants known to be in existence are listed alphabetically, by state. In addition, the plant's address and the brand name of the lightweight aggregate it produces is given.

The map itself assists in graphically pinpointing the actual geographical location of all of the lightweight aggregate producing plants.

This combination map and listing is 25½ inches wide and 22 inches high. The sturdy paper stock it's printed on makes it ideal for framing or pasting on any flat surface.

The following are the quantity prices charged for this map.

QUANTITIES	PRICE
1 — 10 maps	35¢ each
11 — 20 "	30¢ "
over 20 "	25¢ "

We will be happy to fill your order for any number of maps you may desire.

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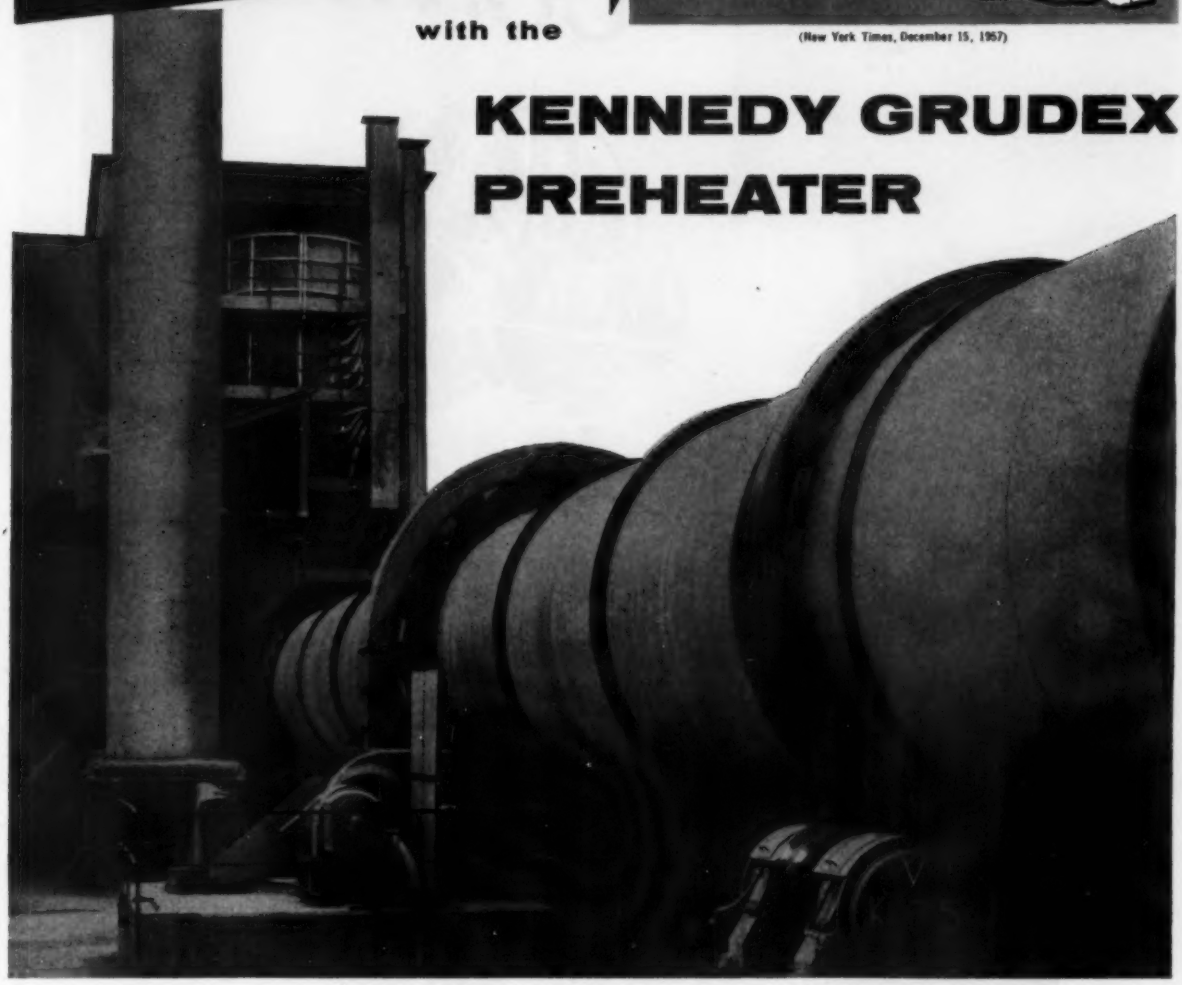
YOU CAN BEAT THIS

> ... increase *{in cement price}* would not cover the 35-cents-a-barrel rise in costs that resulted from higher fuel oil prices. Cement prices usually are revised at the

(New York Times, December 15, 1957)

with the

KENNEDY GRUDEX PREHEATER



On dry process cement kilns, the KENNEDY Grudex Preheater can reduce fuel consumption by as much as 40%!

The KENNEDY Grudex Preheater is manufactured exclusively by KENNEDY-VAN SAUN

CONSIDER THESE ADDITIONAL ADVANTAGES

- **Increases kiln capacity.**
- **Requires no elaborate supporting structure.**
- **Less fuel means lower gas volumes to be handled by draft fans and dust collectors or precipitators.**
- **No moving parts are exposed to heat.**
- **Gas and feed are separate—can produce low alkali cement.**
- **Reduces ring formation—extends refractory life.**

CRUSHERS • MILLS • KILNS • PNEUMATIC CONVEYING
• COOLERS • PULVERIZED COAL-GAS-OIL-FIRING SYSTEMS
• COMPLETE CEMENT PLANTS—WET OR DRY
• KENNEDY RESEARCH AND TESTING SERVICES

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SLURRY CONTROL

BENDIX NUCLEAR DENSITY GAGE AUTOMATICALLY CONTROLS SP. GR.† OF FEED SLURRIES

†*Specific Gravity*

The fluid content of your slurry can mean the difference between profitable optimum control and costly borderline operation. Down time due to pump failures can be drastically reduced and plugged equipment can be virtually eliminated with the Bendix* Nuclear Density Gage. In processes using kilns to remove water, fuel savings can be realized; where efficient recovery of solids from flue gas or optimum ore separation by Specific Gravity is desired, the Gage can be readily adapted.

Bendix Nuclear Density Gage assures successful processing in metals mining and non-metals mining operations. Control of the fluid or solids content of your slurry can be maintained precisely at any desired point. The measuring element does not contact the slurry, therefore abrasive and corrosive processes can be handled with ease. Control is continuous and automatic.

A complete and accurate record of Specific Gravity is provided as rapidly as the process changes occur. Inadequate sampling techniques and "post mortem" laboratory analyses need no longer be tolerated.

***Applications: Wet slurries in ball mills, rod mills, flue gas recovery systems, dust collectors, flotation, classifiers, thickeners, etc.**

Bendix furnishes consulting service for every installation. Write for full details to Cincinnati Division, Dept. 430, 3130 Wasson Road, Cincinnati 8, Ohio.

*REG. U.S. PAT. OFF.

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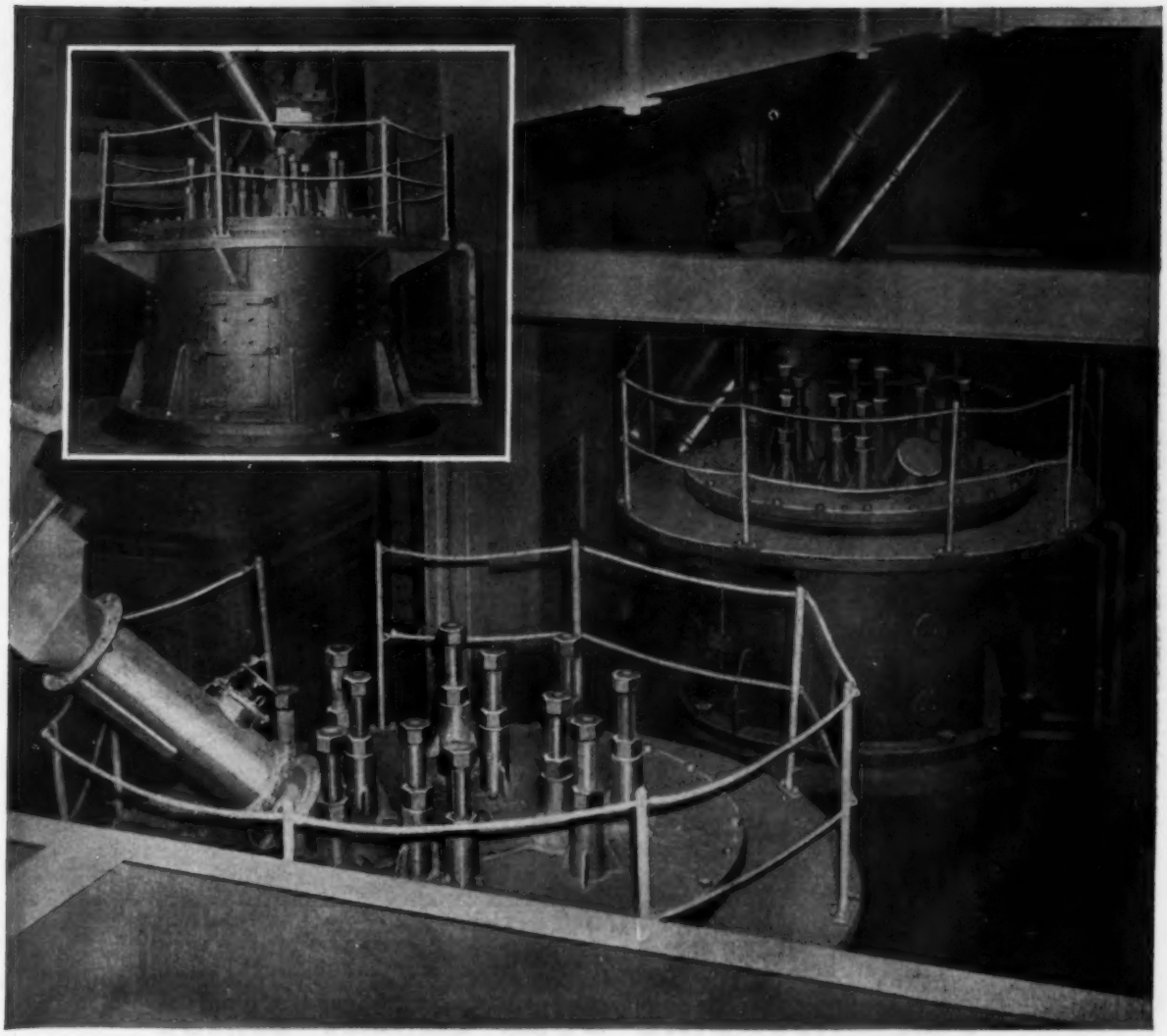


CLOSED-CIRCUIT GRINDING AT LOW COST

with B&W Type B Pulverizers

At Alpha Portland Cement Company's plant in Cementon, N.Y., two B&W Type B Pulverizers grind raw materials in a B&W Closed-Circuit System. One pulverizer has been in service for about 20 years and the other more than one year. Total capacity is 90 to 100 tons per hour and grindability is about 55 Hardgrove.

Alpha and other users have discovered that long life is built into the grinding elements of B&W Pulverizers. This means efficient, low-cost grinding.

Many long service records prove that B&W Type B Pulverizers require less power, low maintenance and minimum space . . . offer, high fineness, easy access and long life.

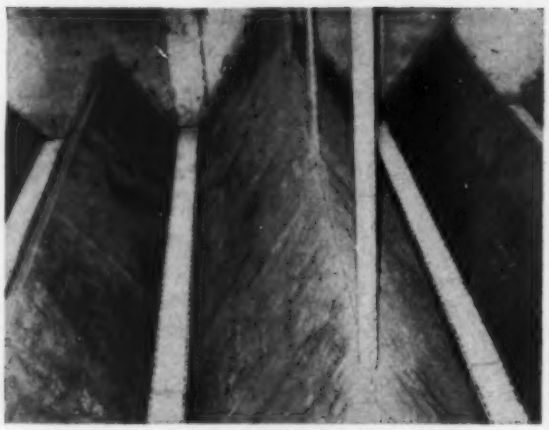
For raw grinding economy call on B&W. Write, The Babcock & Wilcox Company, Boiler Division, Process Equipment Department, 161 East 42nd Street, New York 17, N. Y.

BABCOCK & WILCOX

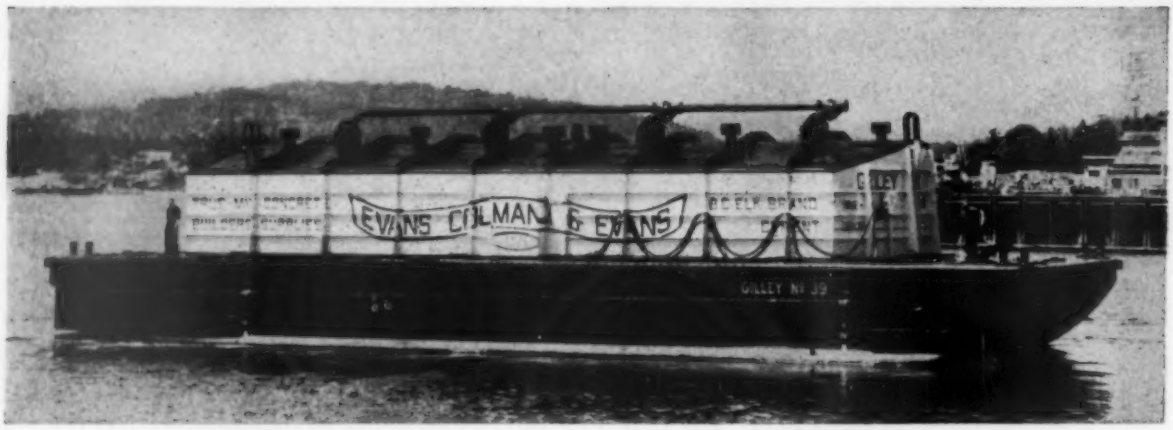
BOILER DIVISION

C-218

Fuller-Kinyon Pump which conveys cement from barge to storage on shore.



Looking down into V-bottom hoppers, shows open type Airslides.



FULLER DEVELOPS FIRST ALL-PNEUMATIC, SELF-UNLOADING BULK-CEMENT BARGE

Always looking for faster, more efficient means of handling bulk Portland cement, Fuller engineers developed and designed the first all-pneumatic, self-unloading barge now in the service of Gilley Bros. Limited of New Westminster, B. C.

The barge is completely self-contained, with all unloading equipment and accessories on board. The hold comprises eight V-bottom hoppers, each equipped with open type F-H Airslide® fluidizing conveyors. Enclosed type Airslides convey from the hoppers to a Fuller-Kinyon stationary pump located underneath the hoppers, the pump conveying the cargo to storage on shore.

Capacity of barge is 4500 barrels and can be unloaded at rate of 450 to 600 barrels an hour, depending upon local conditions and distance of conveying. Cargo can be completely unloaded, leaving practically no residue in the hoppers. Unloading requires only part time attention of one operator.

Initial unloading of the Gilley Bros. barge with a cargo of 4300 barrels was very successful, complete discharge taking not over 8½ hours. This performance has resulted in the purchase of a second barge of 5000 barrels capacity.

Here is but one example of how Fuller ingenuity and equipment are being put to work to help you cut costs and increase production. When you have a problem of conveying dry bulk materials, Fuller engineers will gladly make a study of your conditions and submit suggestions . . . without any obligation on your part.

FULLER COMPANY GENERAL AMERICAN TRANSPORTATION CORPORATION

Fuller

. . . . pioneers in harnessing AIR

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4373

FULLER COMPANY

100 Bridge St., Catasauqua, Pa.

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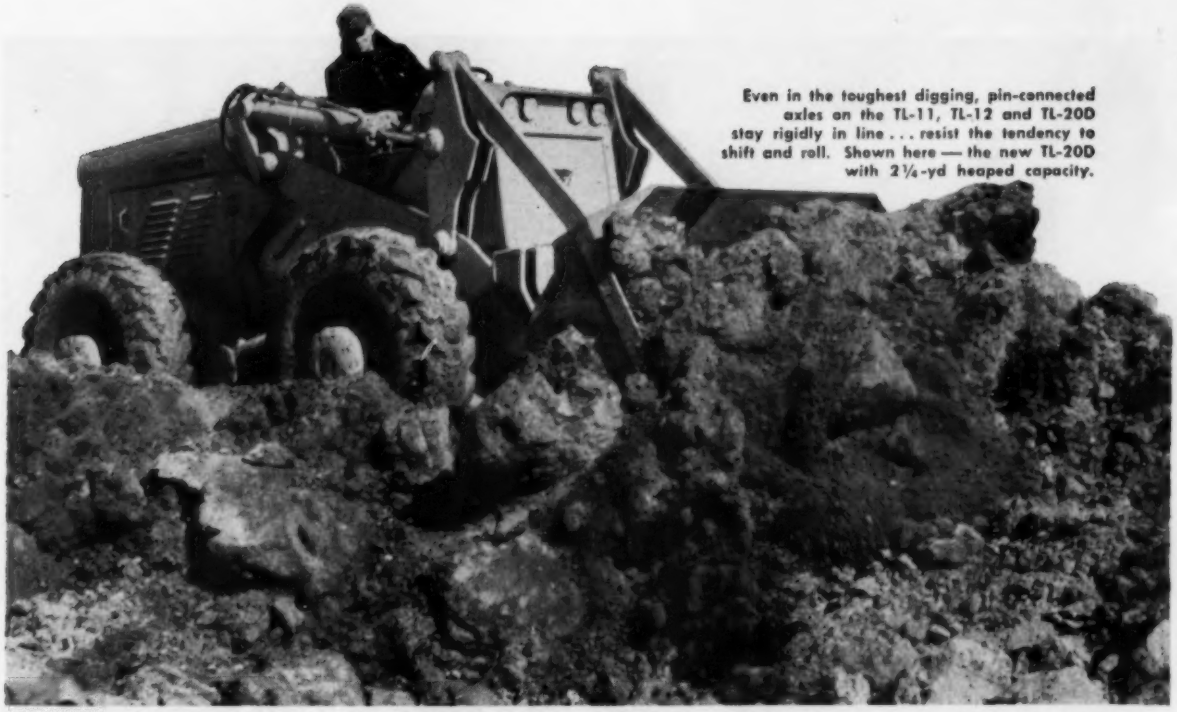

Even in the toughest digging, pin-connected axles on the TL-11, TL-12 and TL-20D stay rigidly in line . . . resist the tendency to shift and roll. Shown here — the new TL-20D with 2¼-yd heaped capacity.

FOR EXTRA STRENGTH . . .

TRACTOLOADER® axles are pin-connected directly to frame

No Rolling and shifting under load!
Another example of TRACTOMOTIVE quality construction

You profit from Tractomotive's experience building 20,000 rugged crawler loaders. This design know-how goes into its TRACTO-LOADERS. That's why drive axles on the heavier TRACTO-LOADERS are pin-connected directly to the frame with 2-inch diameter steel pins instead of by the usual U-bolt method. There is no possibility of "play" . . . no bolts to work loose . . . no mounting plates to warp out of shape.

And these strong, pin-connected axles are EXCLUSIVE WITH TRACTOMOTIVE!

Here is one more reason why you get higher production . . . lower upkeep with TRACTOLOADERS.

This design difference makes a performance difference — and a profit difference!

TRACTO — *a sure sign of modern design*

THERE IS A FAST-WORKING TRACTOLOADER TO FIT EVERY JOB — 5 MODELS — ½ cu yd to 2¼ heaped . . . two and four-wheel drive.

BIG Loaders Need BIG Loader Construction

TRACTOMOTIVE AXLE is attached to frame with 2-inch diameter steel pin with 6 inches of bearing surface.

ORDINARY AXLE has a modified U-bolt connection—mounting plate with bolts.

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Keep Haul Units Humping

No Loading Bottlenecks with Dependable MANITOWOC Performance!

When there's a Manitowoc in your pit, trucks keep moving . . . production never slows down. That's because dependable, bonus-capacity Manitowocs take bigger bites, deliver bigger payloads. And rugged simplicity of design keeps output steady under the toughest digging conditions. Here are some of the outstanding Manitowoc features that pay off in *any* pit operation . . .

Faster Cycle Speed . . . Manitowoc's simplicity of design provides a minimum number of gears and pinions with only working gears turning to make full use of all available horsepower . . . the exclusive "powerflow" slide pinion arrangement uses only one set of clutches to drive, travel, swing and boom hoist. Balanced working speeds keep power at the dipper.

Rugged Construction . . . From the wide, self-cleaning, box-type treads, right up to the extra-strong, internally reinforced boom and dipper sticks, Manitowocs are engineered to tackle tough rock duty. Every component is built to take the steady pounding of rock digging.

More Power and Stamina . . . Manitowoc adds power by saving power . . . the full power flow is directed only to the operating function. That's why Manitowocs dig faster and longer without downtime . . . that's why they outperform any other shovel in their class.

Full Range of Models . . . to fit any pit or quarry operation; all quickly converted to dragline or clamshell use. Get more profit-filled information on the full line of Manitowoc shovels . . . call your distributor now!

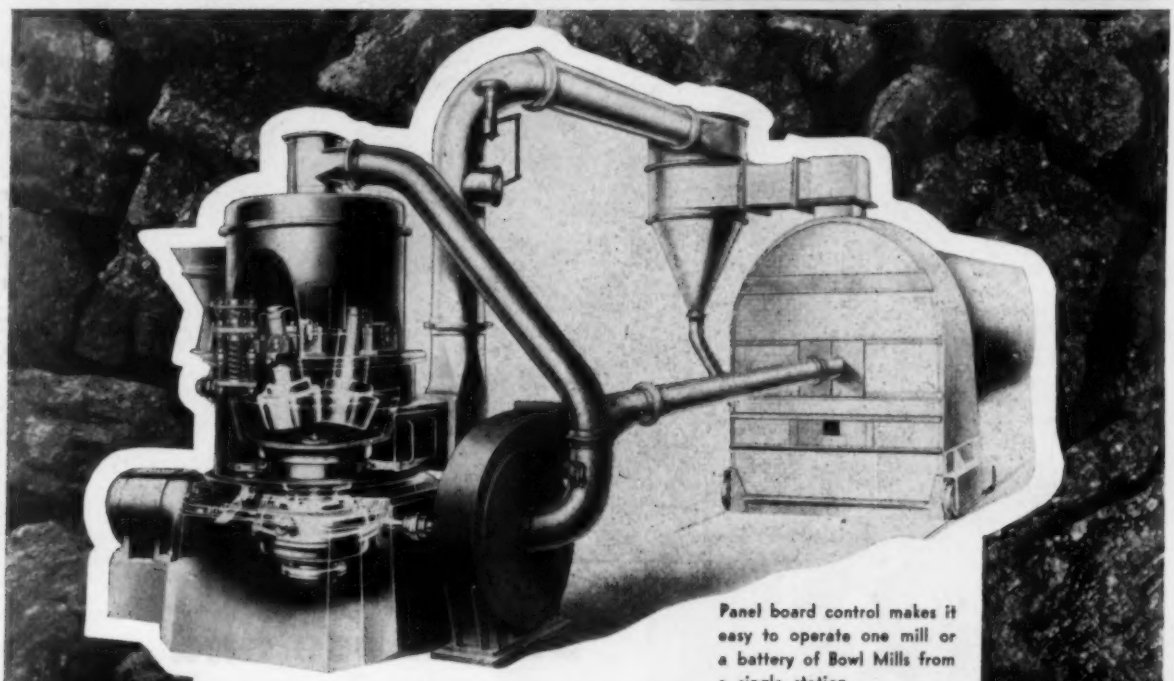
Manitowoc

MANITOWOC ENGINEERING CORP.

MANITOWOC, WISCONSIN

CRANES	SHOVELS	DRAGLINES	TRENCH HOES
20 TON - 100 TON	½-YD. - 5½-YD.	½-YD. - 6-YD.	½-YD. - 2½-YD.

How the RAYMOND BOWL MILL makes COAL a better Fuel



Panel board control makes it easy to operate one mill or a battery of Bowl Mills from a single station.

THE Raymond BOWL MILL is an integral unit that is specifically designed for the dual purpose of grinding and firing coal to rotary kilns. Here are some of the factors that have made it the standard direct-firing unit for lime, cement and dolomite kilns, and industrial furnaces.

1. Handles coal of any grade or moisture content
2. Dries wet coal in mill while pulverizing
3. Gives uniform grind at all rates of mill feed
4. Instant fineness control while mill is running
5. Maintains proper coal-air mixture to burners
6. Thermostatic control for uniform air temperature

Its high precision bearings and automatic oiling system assure quiet, vibrationless operation, as well as record low maintenance and lubrication costs. It is built to give 24-hour continuous operation for long periods without shutdowns.

The Bowl Mill is so efficient in the utilization of powdered coal, and so economical in performance, that it is often installed to replace units using other types of fuel. If you are equipping a new plant or modernizing the present one, be sure to get the facts on Bowl Mill firing.

Write for Raymond Catalog #75

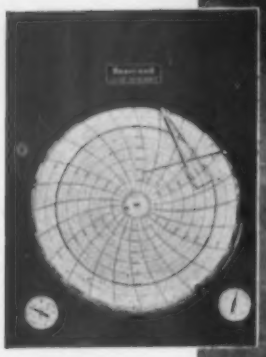
COMBUSTION ENGINEERING, INC.

Raymond Division

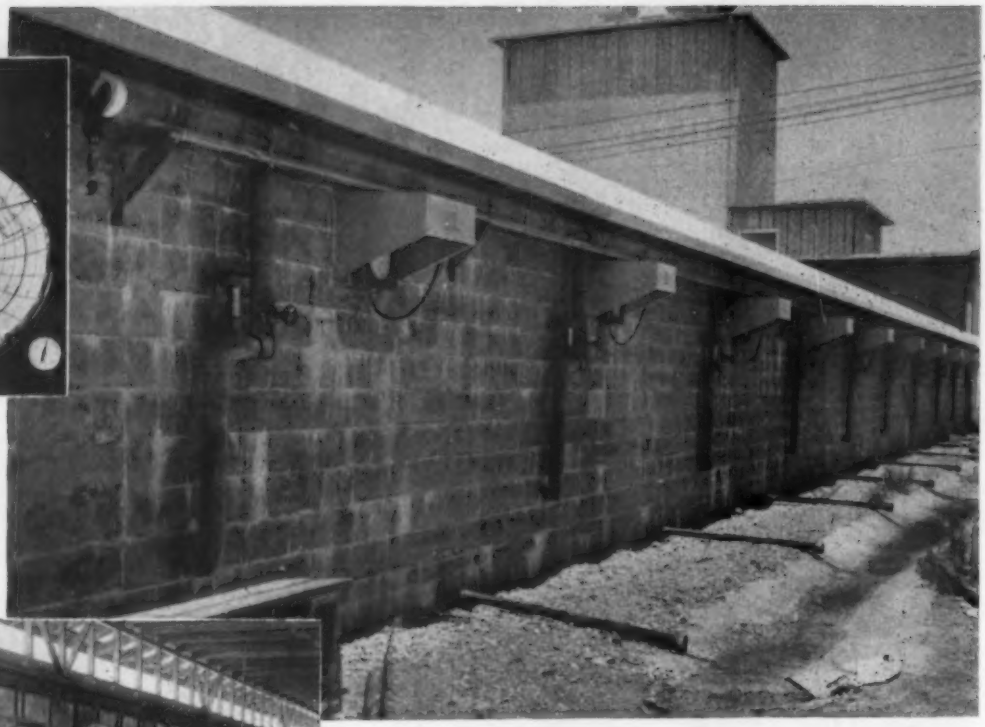
1321 North Branch St.
CHICAGO 22, ILLINOIS

SALES OFFICES IN PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada



Steam supply line runs the full length of 9 kilns, with a Honeywell valve controlling the steam supply to each kiln. Brown thermometer-controllers operate these valves to regulate kiln temperature. ▶



Steam use and curing time reduced 40% for concrete blocks

J. R. Asbell Block Company of Panama City, Florida, saves steam and increases production by the use of Brown recording thermometer-controllers on their new fully sealed kilns.

The thermometer-controllers allow the proper amount of steam to enter the kilns in order to maintain curing temperature. Steam consumption has been cut almost in half. Curing time is now three hours instead of five. With the close temperature control provided by the instruments and sealing of the kilns, an ideal curing temperature of 180°F. is maintained. This precise temperature regulation has cut culls to a new minimum.

To learn how you can put these instruments to work profitably in your own plant, call your nearby Honeywell field engineer. He's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR Co., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.

Honeywell

H HONEYWELL First in Controls

Where Armco Liner Plate can save you time and money

Conveyor Tunnels

Tunnels of Armco Liner Plate are widely used under storage bins or piles. The corrugated metal design gives maximum strength with minimum weight. Gate openings can be provided simply by leaving out plates where desired. Circular structures are available in diameters from 4 to 15 feet in 2-inch increments.

Storage Bins

You can easily meet your storage requirements, too, with Armco Liner Plate storage bins. Capacities range from 50 to 3000 tons. The light weight steel plates are easily and quickly bolted together to form strong, long-lasting bins. If desired, you can dismantle an Armco Liner Plate bin and move it to another location.

Send coupon for details

The manual "Armco Liner Plate," will give you complete details. Just fill out and send the coupon below. Armco Drainage & Metal Products, Inc., 3318 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation.

ARMCO

LINER PLATES

Armco Drainage & Metal Products, Inc.
3318 Curtis Street, Middletown, Ohio

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1—Williams 4-roll Mill (Gnome Size), Complete.
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10 ton Whitcomb Locomotive
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5'x22" Telsmith Rotary Screen
37' Bucket Elevator
14x26 Acme Jaw Crusher
2 5000 gal. Vertical Tanks

COOLEY GRAVEL COMPANY
Chillicothe, Missouri

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An opportunity with a future is open to the properly qualified man. Must be thoroughly familiar with crushing, screening, belt conveying, and magnetic separation equipment, and all electric power and control details connected thereto. Responsibility will be for all maintenance in a five plant operation. Give age, experience, job references, and salaries earned.

PQ-102-B, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Ill.

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Multi plant cement company needs engineer. Opportunity for training and advancement. Give full details on background. Replies confidential.

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Large cement company needs chemist or chemical engineer. Write giving details of education, experience, and salary desired. Replies confidential.

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POSITION WANTED

Mature operating man seeks job in the U.S. Previously, full charge large and small plants producing stone and lime and industrial sand. Am able to step in and run any of the above or related operations. Excellent References.

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SPECIALISTS IN DESIGN OF CRUSHED STONE, SAND, GRAVEL AND READY MIX PLANTS
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CORE DRILLING
Thomasville Drilling & Testing Co.
THOMASVILLE, PENNA.

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Must be capable of taking charge of Gravel and Concrete Plants.

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Specializing in Quarry Blast Holes using Ingersoll-Rand Drillmasters

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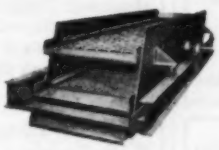
NEW CURRENT MODELS IMMEDIATE SHIPMENT FROM OUR FACTORY - WRITE, WIRE OR PHONE

NEW BONDED® HEAVY DUTY VIBRATING SCREENS

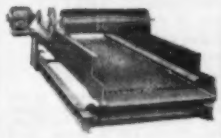
BUY WITH CONFIDENCE, OUR REFERENCES ARE: Ohio National Bank, Columbus, Ohio. Dun and Bradstreet



Model Number	No. of Decks	Screening Area	Sale Price
124A	1	2'x4'	$ 443.00
224A	2	2'x4'	472.00
126A	1	2'x6'	472.00
226A	2	2'x6'	501.00
136A	1	3'x6'	581.00
236A	2	3'x6'	688.00
336A	3	3'x6'	956.00
138A	1	3'x8'	675.00
238A	2	3'x8'	815.00
338A	3	3'x8'	996.00
336B	3	3'x6'	1620.00
436B	4	3'x6'	1885.00
138B	1	3'x8'	1510.00
238B	2	3'x8'	1620.00
338B	3	3'x8'	1735.00
248B	2	4'x8'	2310.00
348B	3	4'x8'	2440.00
2410B	2	4'x10'	2400.00
3410B	3	4'x10'	2550.00
2412B	2	4'x12'	2580.00
3412B	3	4'x12'	2970.00
4412B	4	4'x12'	3165.00

HEAVY DUTY MODELS, TYPE B: Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14', 1 to 5 decks. **Write for New 8-page Bulletin No. 1087.**

NEW BONDED® GENERAL DUTY VIBRATING SCREENS



More than 6000 Mines and Quarries have modernized with Bonded Equipment.

GENERAL DUTY SCREENS, TYPE A: Eccentric weight mechanism, spring mounted, 1 to 3 decks, 2' x 4' to 3' x 8'. **Write for New 8-page Bulletin No. 1086.**

For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals, including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry.

NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS

Complete Pre-Fab sections quickly and easily jointed together on the job. We take our loss on our stock of short length belting. You can save as much as 50% on BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2¼" or 2 7/16" diam. shaft. Belt is new 4-ply, 28-oz. duck, ⅛" top rubber cover x 1/32" bottom cover and is fresh stock made by leading manufacturers.

Remember, You Save Up To 50%

CONVEYOR PRICES INCLUDE BELTING

Belt Width	Length of Conveyor	List Price	Sale Price
14"	25'	$1397	$ 722
14"	50'	2222	1144
14"	85'	3377	1733
16"	20'	1262	636
16"	45'	2137	1088
16"	60'	2862	1380
16"	90'	3712	1900
18"	25'	1477	794
18"	45'	2217	1166
18"	70'	3142	1648
18"	85'	3697	1933
18"	100'	4259	2230
18"	130'	5362	2797
20"	25'	1517	828
20"	60'	2882	1533
20"	75'	3467	1838
20"	90'	4062	2145
24"	25'	1590	898
24"	45'	2430	1330
24"	70'	3480	1875
24"	100'	4740	2514
24"	120'	5560	2950
24"	150'	6840	3603
30"	50'	2911	1617
30"	70'	3671	2119
30"	90'	4521	2614
36"	25'	1618	1118
36"	45'	2358	1678
36"	60'	3636	2096
36"	100'	5716	3214

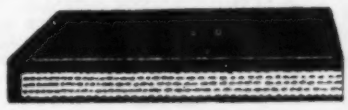
For conveyors longer or shorter than those listed above, add or deduct the following per foot prices according to belt width. Prices include belting. **Write For Bull. #1138.**

For 14" belt	$16.84 per foot
For 16" belt	$16.04 per foot
For 18" belt	19.24 per foot
For 20" belt	20.37 per foot
For 24" belt	21.78 per foot
For 30" belt	24.75 per foot
For 36" belt	27.95 per foot

Bonded troughing idler conveyors are also available with truss type construction. **Write for Bulletin #1189 and prices.**

NEW CONVEYOR BELTING SAVE UP TO 30%

AND WE PAY THE FREIGHT ON 200 POUNDS OR OVER



Major Brand: 12# to 15# Average Friction Pull. 800# to 1000# Average Cover Tensile.

Heavy Duty 4-ply, 28-oz. duck, ¼" top rubber cover x 1/32" bottom rubber cover belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stocks.

Width	Ply	List Price Per Ft.	Sale Price Per Ft.
14"	4	$3.63	$2.53
16"	4	4.08	2.97
18"	4	4.51	3.29
20"	4	4.97	3.80
24"	4	5.85	4.26
30"	4	7.18	5.21
36"	4	8.51	6.16

Major Bee Brand: 16# to 19# Average Friction Pull. 2500# to 3000# Average Cover Tensile. Skim coat between plies.

A high grade of heavy duty 4 and 5-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom rubber cover. These belts are for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal, and other similar materials, both wet and dry. Belts have molded rubber edges.

Width	Ply	List Price Per Ft.	Sale Price Per Ft.
14"	4	$4.31	$3.06
16"	4	4.85	3.46
18"	4	5.39	3.83
20"	4	5.90	4.37
24"	4	6.94	4.94
30"	4	8.53	6.07
36"	4	10.09	7.35
24"	5	8.14	5.78

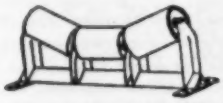
Major Bee X Brand: 20# to 24# Average Friction Pull. 3500# to 4000# Average Cover Tensile. Skim coat between plies.

A heavier duty 28-oz. duck belt with ⅛" top rubber cover x 1/32" bottom rubber cover. For the higher abrasion resistance applications and handling of materials where more strength is required to give greater belt life.

Width	Ply	List Price Per Ft.	Sale Price Per Ft.
16"	4	$5.48	$3.78
18"	4	6.10	4.20
20"	4	6.68	4.79
24"	4	7.87	5.41
30"	4	9.70	6.65
24"	5	9.11	6.31

Other widths, plies, duck weights and cover thickness available at low prices. **Write for Free Sample.**

NEW IDLERS AND RETURN ROLLS SAVE 25%



3-roll, 5" diameter Troughing Idlers for:

14" belt	$18.50	24" belt	$21.25
16" belt	19.25	30" belt	22.00
18" belt	20.50	36" belt	22.75
20" belt	20.75	48" belt	25.50

1-roll, 5" diameter Return Idlers for:

14" belt	$7.25	24" belt	$ 8.50
16" belt	7.50	30" belt	9.50
18" belt	8.00	36" belt	10.00
20" belt	8.25	48" belt	11.50

All steel. Interchangeable with other well-known makes. Furnished with easily replaceable prelubricated sealed ball bearings. Also can be **furnished with greasable type Alemite Fitted bearings at slight additional cost. Maintenance is negligible. Bonded Rubber Disc Impact Idlers priced from $61.00. Write For Bulletin #1136.**

NEW BONDED® FEEDERS

For high tonnage and controlled feed of Aggregate, Sand, Gravel, Crushed Stone, Clay products, Metallic Ores, Coal, Cinders and almost any other bulk material to Crushers, Screens, Conveyors, Mills and other process machinery. Feeder may also be driven from tail shaft of Bonded Troughing Idler Conveyors, thus eliminating the necessity of two motors. All models available in abrasion resistant alloy steel plate. Capacities to 440 tons per hour. **Write for Bulletin #1211.**

Priced from **$295.00**

NEW BONDED BUCKET ELEVATORS

Open or Enclosed, Vertical or Inclined Bucket Elevators with Continuous or Spaced Buckets mounted on Chain or Belting. Bonded's 19 standard models mean lower prices and you get a Custom Built Elevator at no extra cost. There is a style of bucket for virtually every material or condition: wet or dry, lumpy or fine, granular, slivery, or pellet shapes, hot or chemically active. Because of the wide variety of sizes and types, prices will be quoted on request. Bonded has a complete line of Continuous Steel, Salem Steel and Malleable Iron Elevator Buckets for prompt shipment at Low Prices. A complete line of Parts and Accessories available to build your own Bucket Elevator. **Write for Bulletin #1203.**

BONDED SCALE AND MACHINE COMPANY

PHONE Days: Hickory 4-2186 — **WRITE FOR FREE CATALOG AND PRICES** — **PHONE Evenings: AX. 1-2213, HU. 6-3156**

110 Bellevue — **Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders** — **COLUMBUS 7, OHIO**

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3—3075 CFM Inger. Rand 2300 V
5—1373 CFM Gardner Denver 2300 V
3—670 CFM-Inger.-Rand 40T-440 V

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3—Gen. Elec. 25 ton 44 ton 70 ton
3—Whitcomb 65 ton—1-115 ton G.E.
1—Davenport 20 ton Gasoline
1—6 ton 1—8 ton Brookville

175 H.P. 3 DRUM ELEC. HOIST

175 H.P. 3 Drum Hoist, 25 HP. Swinger

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1500 ton MZ 32, DP 2, AP 3, 20' & 40'

STEEL DERRICKS

Guy: 3 ton 85 ft. Boom, 25 ton 60 ft. Boom, 15 ton 100' Boom, 29 ton 115' Boom, 50 ton 100' Boom.
Stiff Leg: 5 ton 70 ft. Boom, 15 ton 100 ft. Boom, 35 ton 100 ft. Boom, 75 ton 135 ft. Boom. 1—5 ton 100 ft. Boom.

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177—Dump Std. Ga. 20, 16, 12, 6 & 4 yd.
36—Flats—10 ton, 40 ton, 50 ton cap.
44—Tank Cars—8,000 & 10,000 Gal. Cap.
75—V Dump Cars, 1½ & 2 Yd.

GRINDING MILLS

Ball Mills—4'6"x9', 6'7"x6', 6'x10', No. 77 and 6'6" x 14'6"
Hardinge Mills—5'x22", 7'x48" and 10'x36"
Special—NEW 8'x60" Hardinge Ball Mill
Rod Mills—3'x6', 3'x8', 4'x8', 5'x10'
Tube Mills—5'x22', 6'x22', 6'x6"x21' & 7'x18"

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Jeffrey—15"x8", 24"x18" and 42"x36"
Pennsylvania 8XT-B-48 THOR, 8XC 12-58 Reversible and 8XT-8
Cedar Rapids 5360H and 3030 Double Impeller Impact Breaker
Williams—GA-60 44"x60" feed opening

APRON FEEDERS

48"x8', 48"x18' and 48"x40' Link Belt

JAW CRUSHERS

Blake Type 40"x42", 36"x48", 30"x42", 30"x36", 12"x24"
Single Shaft 30"x42", 25"x40", 24"x36", 20"x36", 15"x24" and 10"x24"
Cam and Roller 16"x32", 14"x26", 11"x26", 10"x20" and 6"x20"

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Symons 26", 3' and 4' stand. and 2' Shorthead
Kennedy 19S, 25S and 37S
Sup. McC. 6", 10" and 18"
Traylor 3 and 4' Type TY

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6", 10", 14", 16", 28" and 30" Sup. McC.
3, 4, 5, 6, 7½, 8, 9, 12 Allis-Chalmers Gates Style K
Telsmith 25B ANDIOA

ROTARY DRYERS AND KILNS

Dryers—4'x20', 5'-6"x50', 6'x50', 80"x60'
Kilns 4' x 26', 2-8' x150', 7'6" and 9'0" x 200', 7'6" and 11'0" x 200'

WASHERS—CLASSIFIERS

78"x26' 6" Reynlex Akins Spiral Classifier
36"x25' Eagle Twin Screw Fine Material Classifier-Washer-Dewaterer
Telsmith 20"x15' Twin Screw Sand Classifier and Size 10 Sand Tank
Eagle 30"x15' Single Screw Coarse Material Washer-Dewaterer
McLanahan—10"x30' and 12"x30' Log Washers

DIAMOND PRIMARY PORTABLE CRUSHING PLANT

Model 2A—15"x24" Jaw Crusher, 20"x8' Apron Feeder with Hopper, 24"x26' Delivery Conveyor, gasoline engine on pneumatic tires.

CEDAR RAPIDS SECONDARY PORTABLE CRUSHER

Model 2A, 24"x16" Rolls, 3'x8'—1½ Deck Screen, Roto elevator, 4 conveyors, gasoline engine on pneumatic tires

CONVEYOR BELT

4000 Ft. 20 in. 42 in. 54 in.

24" BELT CONVEYOR

2500 Ft. Link Belt Channel Frames

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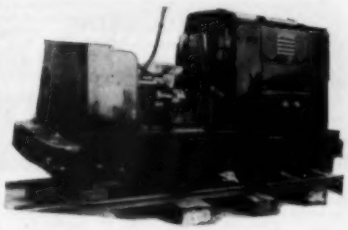

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H.P.	MAKE	TYPE	SPEED
2500	*G.E.	MT (Mill Type)	257
1100	*G.E.	MT	720
1000	G.E.	M-575-S	1200
1000	*West.	CW	450
600	*G.E.	M-6345-S	1800
500	G.E.	M-6345	1200
400	*G.E.	MTP-565	1200
350	*Al-Ch	ARYW	1800
300	Cr-Wh	SR-70-R	1800
250	Al-Ch	ARY-626	1800
250	*G.E.	I-M-17A	720
200	G.E.	I-M-16	600
200	*West.	CW1950A	514
150	Cr-Wh	SR-50R	1800
150	G.E.	I-M-15A	600
125	G.E.	I-M-15A	600
100	G.E.	I-E-13A	1800
100	G.E.	MT-558	720
100	G.E.	I-M-15A	425
75	West.	CW-770	1200
75	G.E.	MT-347	1200
75	G.E.	MT-356	900
75	G.E.	MT-352	720
75	G.E.	I-M-10	600
60	G.E.	MT-536	1200
60	*West.	CW-762C	900
50	*G.E.	MT-536	1200
50	Al-Ch	ARY-223	900
50	West.	CW-758	720
50	Al-Ch	ANY-26	600
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1750	*G.E.	K	1800
1250	*Al-Ch	ANX	3600
600	West.	CS	720
600	*G.E.	K-63455	1200
500	*G.E.	K-63455	1200
500	*G.E.	I-13-E	900
350	*G.E.	KT-559-A	1800
300	*G.E.	K-6344	1200
250	*W (TE)	CS-81205	1800
250	*G.E.	KT-599-S	1800
250	*West.	CS-875-S	1800
250	Brook	RS-28	1200
200	*G.E.	FT-540	3600
200	*G.E.	I-K-13B	1800
200	West.	CSP-581-S	1800
200	Brook	RS-27	1200
200	*West.	CS-930-A	900
200	G.E.	KT-564-S	720
200	*Al-Ch	AN-37-G	720
200	*West.	CS-1010	600
200	Al-Ch	ARW-631	600
150	Cr-Wh	SC-140	3600
150	Al-Ch	AN-30-F	1200
150	West.	CSP-5815	1200
150	G.E.	I-K-15A	900
150	*West.	CS	600
125	Al-Ch	AR-226	1800
125	Cr-Wh	S-Q	1200
125	G.E.	K-558	900
100	W (TE)	CS-507-S	3600
100	G.E.	FT-542-Z	1800
100	Al-Ch (TE)	ARZ-826	1200
100	Al-Ch	AW-23-D	1200
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Both of above are direct coupled mounted on I-R frame, and have line starters. Like new condition.

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1—45-ton Whitcomb Diesel Electric Locomotive. Reconditioned by Baltimore & Ohio Railroad.

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Repres.: Bonded Scale & Machine Co.

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Ty-Rock F600 Screen 4'x10'
Two Type 38 Hummer Screens 4'x10'
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Climax 10"x20" Jaw Crusher
Cedar Rapids 9"x12" Jaw Crusher
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Farrel 36"x10" Blake Crusher
Sturtevant #1 Rotary Crusher
8"x27' Enclosed Elevator
8"x29' Enclosed Elevator
8"x31' Enclosed Elevator
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Elevator Chain: C102B-111-102½
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40-A Marion Dragline, 90', 2½ yd.
903 Osgood Dragline, 70', 2 yd.
170-B Bucyrus Erie 6½ yd. Elec. Shovel
120-B Bucyrus Erie 4 yd. Elec. Shovel
88-B Bucyrus Erie 4 yd. Standard Shovel
1055 P&H 2½ yd. Standard Shovel
80-D Northwest 2½ yd. Standard Shovel
51-B Bucyrus Erie 2 yd. Standard Shovel
38-B Bucyrus Erie Comb. Shovel-Crane
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FOR SALE

TOP CONDITION—1954 Koehring Excavator Crawler Shovel Model 205-2A; ½ yd. dipper stick; ½ yd. back-hoe, new-never used; ¾ yd. dragline bucket, 51' boom.

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150 HP Amer. #140 3d Gas Hoist
1½ yd. Lima 602 Crane. 110' Boom
3 yd. Manitowoc #3900 Crane. 100' Boom
2½ yd. Link-Belt K-595 Crane. 120' Bm.
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5 yd. Bucyrus 120B Electric Dragline

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1905 Railway Exchange Bldg., St. Louis 1, Mo.

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AL. CH. 6'x16' BALL TUBE MILL, 30 HP.
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. . . and Thermoid Hose.

Enter 189 on card, page 101

Thermoid

Thermoid Company • Trenton, N.J.

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Accident! But Anaconda SH-D Shovel Cable kept on working in this open-pit mine. Good proof of Anaconda Cable's ability to take it.

CAVE-IN! But this unposed photo shows Anaconda Shovel Cable still working!

Above you see part of an actual cave-in. The Man from Anaconda was Johnny-on-the-spot with a camera, and the picture shows part of what he saw. The complete cave-in was much more extensive.

We use this photo to show how well Anaconda Shovel Cable stands up under abuse. Jagged rocks, sheer drops over cliffs, water-filled ditches—the Anaconda cable is built to endure all these hazards.

We're miners ourselves. All our practical experience—plus knowledge of what makes the best insulation and protective coverings—has gone into this cable.

Anaconda Shovel Cable has a strong, extra-tough—yet highly flexible—neoprene jacket. It resists abrasion, mechanical abuse, flame and water. Its long-lasting Anaconda Butyl Insulation has high dielectric strength, and outstanding resistance to ozone, heat and moisture.

It all adds up to a cable that's ready when the going's rough. For full information about this rugged shovel cable, contact the Man from Anaconda or your Anaconda distributor. Or write directly to: Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

56317

LIVE BETTER ELECTRICALLY

SEE THE MAN FROM ANACONDA® FOR SHOVEL CABLE

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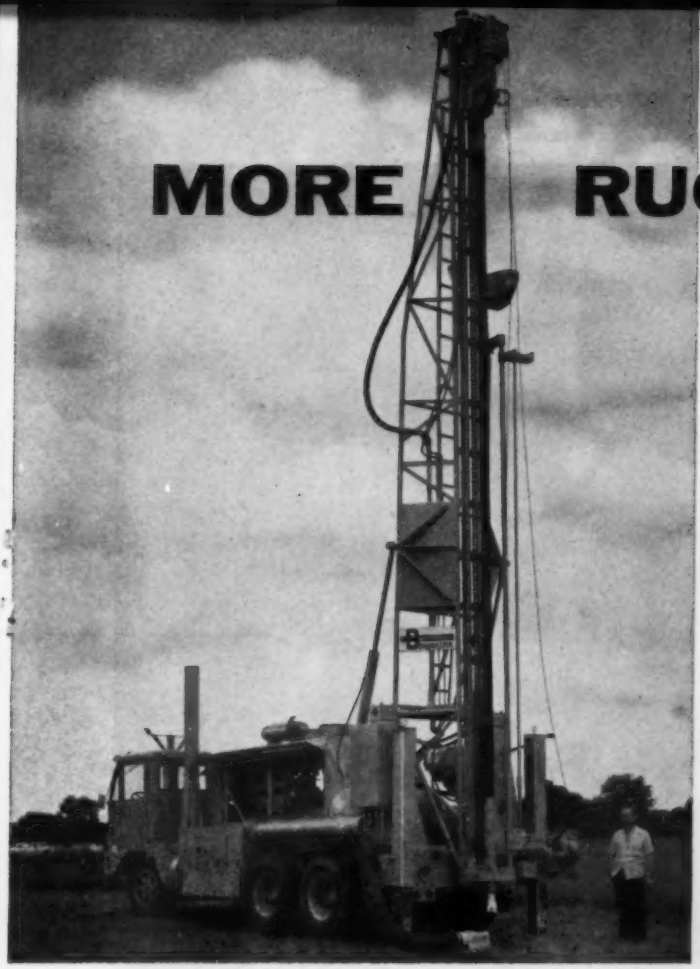
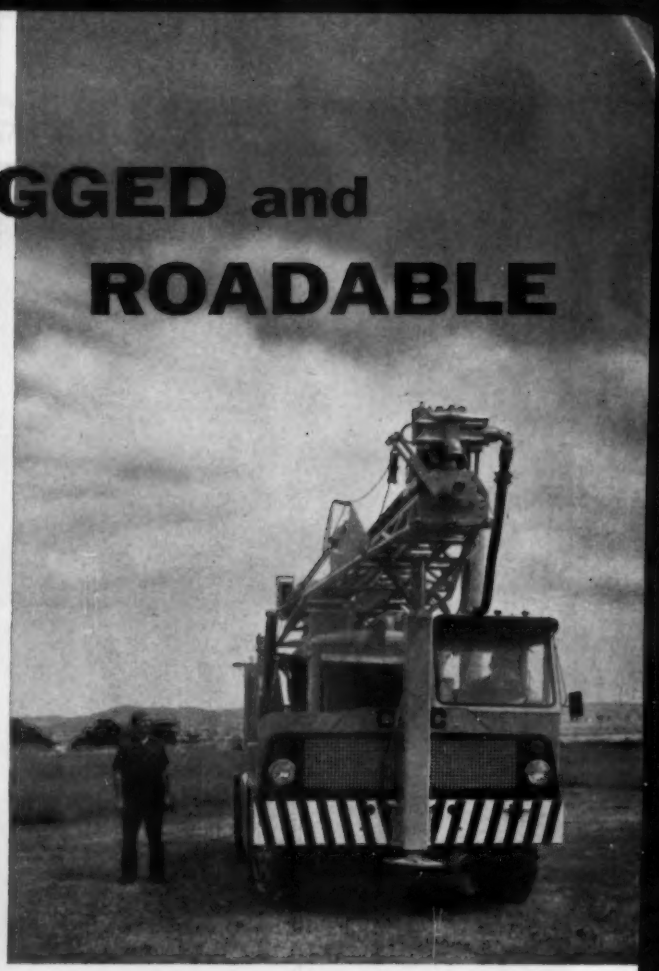


MORE RUGGED and ROADABLE



NEW TRUCK-MOUNTED DRILLMASTER

Speeds Contract Drilling two ways

On The Job...

The new truck-mounted Drillmaster gives you the proved *performance* and *versatility* that have made contract drillers acclaim it as the most productive blast-hole unit ever developed.

You can set up and be ready to drill in a matter of minutes. Tower is raised and leveled effortlessly by hydraulic power. With the I-R revolutionary *down-the-hole* drill you can drill from 70′ up to 350′ or more of 4¾″ to 6½″ blast holes per shift. And for soft non-abrasive over-burden and bed rock, use it as a heavy-duty *rotary drill.*

New "beefed-up" mounting means higher performance than ever before obtainable in a truck unit. Air power for all drilling functions is provided by a 600-cfm Gyro-Flo rotary compressor – known the world over for smooth-running performance, year-round dependability and exceptional freedom from maintenance and attention.

and On The Highway

This improved "TRUCM" mounting features a completely new mobile unit especially designed to I-R heavy-duty specifications by Crane Carrier Corp. – leading maker of specialized carriers. It can go anywhere at sustained highway speeds – meets legal requirements in all 48 States.

Here are the specifications, on the road ready to go:

Length	34′ 11″	Weight	34,000 lb.
Height	12′ 6″	Wheel Base	175″
Width	8′	Compressor Fuel Capacity	200 gal.

Ask your Ingersoll-Rand representative for complete information on this new truck-mounted Drillmaster – the most *rugged* and *roadable* unit you've ever seen.

Ingersoll-Rand

5-735 11 Broadway, New York 4, N.Y.

A CONSTANT STANDARD OF QUALITY IN EVERYTHING YOU NEED FOR DRILLING ROCK

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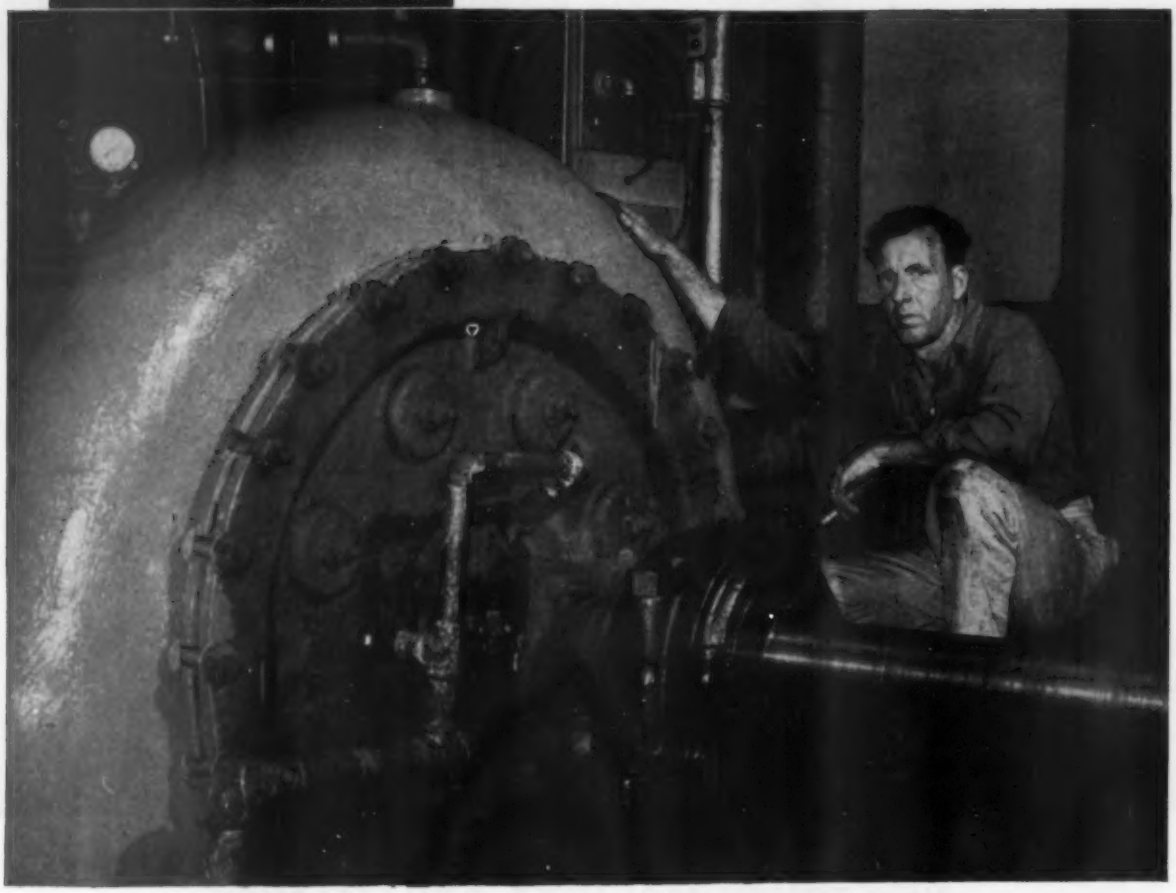
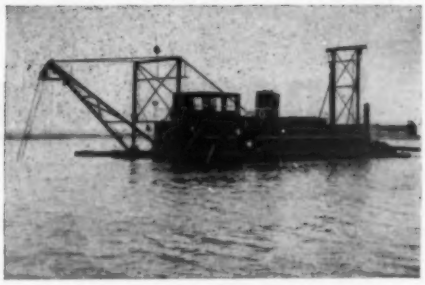
Amsco pump application file —Lake Charles, Louisiana



"Complete pump change-out takes only 10 hours on our 16-inch Amsco..."



Says Mr. Mike Hooks, owner of Mike Hooks, Incorporated, Lake Charles, Louisiana.

"The Amsco design is the easiest for maintenance. We change Amsco impellers in four hours. Suction liners take only three hours. This kind of maintenance takes an average of a day and a half on other pumps.

"Right now, we're working a ship's turning basin in Corpus Christi Bay area . . . 60% sand, 10% gravel, 30% mud. We'll pump 4-million cubic yards (with build-up) before changing a shell. We'll get 150,000 yards per suction liner, and 800,000 yards on engine liners and impellers.

"We use a 900-hp Alco diesel for power with a flexible coupling. The dredge has a rotary cutter. Lift is 10 feet over a 3000-foot pipeline.

"We've got three Amsco pumps now, two 16 inch and a 12 inch. With maintenance so cheap and easy, and Amsco service so good, we'll stick with Amsco pumps."

Amsco® Dredge Pump standard sizes range from 6" to 20" discharge openings. Larger sizes are also available. An Amsco pump engineer will be glad to discuss your requirements, or write for Bulletin 1052P containing full information and specifications on the Amsco line.

AMERICAN Brake Shoe COMPANY

AMSCO American Manganese Steel Division Chicago Heights, Illinois

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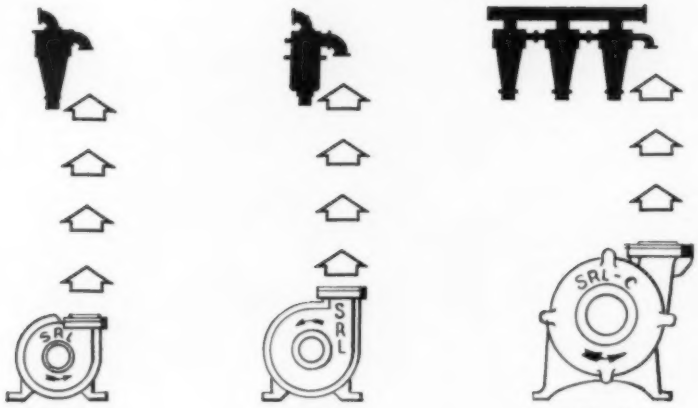

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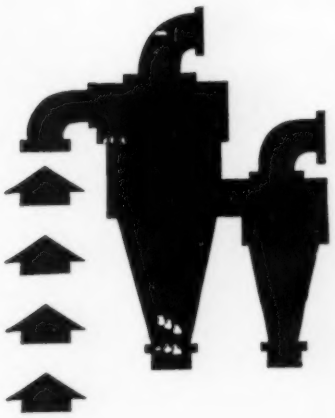
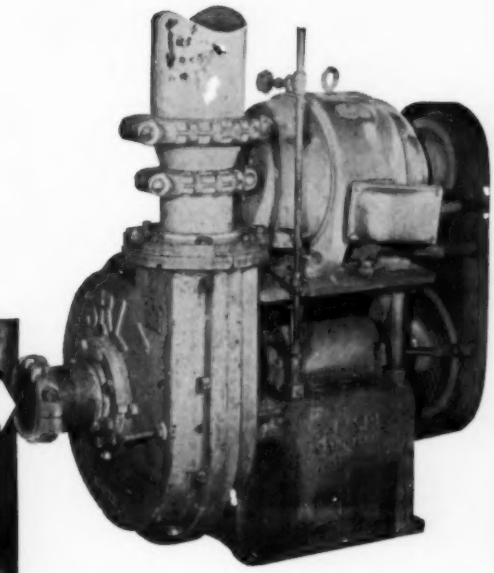
OTHER SIZES ALSO AVAILABLE



STANDARD for CYCLONE SERVICE...



Sixteen 6" x 6" non-clogging Denver SRL Pumps (eight operating, eight stand-by) deliver mill discharge to the cyclones. Available with pressure molded rubber or alloy iron runners.

Write for Bulletin No. P9-B10.

DENVER *SRL* PUMPS

FOR YEARS RECOGNIZED AS THE MOST EFFICIENT PUMP FOR HANDLING SANDS AND SLURRIES.

"The firm that makes its friends happier, healthier and wealthier"

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"OUR EIMCO 105 'LOADER-CARRIER-CRANE-EXCAVATOR-DOZER' SURE SAVED TIME AND COSTS ON THIS JOB"

. . . Says Coast Contractors' President, Frank McHugh

TACOMA, WASH. - Debris loosened by flash floods clogged culvert drainage and 100 feet of county roadbed were washed out. Contracted to handle the "rush" repair job, COAST CONTRACTORS INC. moved their Eimco 105 Front-End Loader on the site. The versatile Eimco cleared debris; dug and dozed its own access way to the bottom of the gully; trenched and graded a new culvert; transported and positioned 48" concrete piping, and (above) rebuilds the roadway.

NOW IT'S A CRANE! Coast Contractor's work crew comes up with a cable hitch attachment that converts the Eimco 105 into a crane for positioning pipe. NOTE: Loader's tough construction, high reach . . . operator visibility . . . tractor stability (with weight on slope side).

"Equipment has to be flexible to fit into our scheme . . . and our Eimco 105 has proven — IT FITS!"

The object of **Frank McHugh's** praise — an Eimco 105 Front-End Loader — "subbed" for many specialized machines in the speedy completion of a road repair job.

As president of Coast Contractors Inc., Frank's big problem is the same as that facing most every general contractor - builder: Getting a variety of odd jobs done fast without having profit "chewed up" by special equipment investments, labor and maintenance costs.

The Eimco 105 is a "hell-for-stout" earthmover with 40,000 lbs. breakout power to handle "tough" jobs normally performed by specialized big equipment. Yet, it is faster and outmaneuvers tractors half its size.

Hydraulic boom and bucket cylinders respond quickly and simultaneously to lever control. The loader assembly is capable of 15,000 lb. lifts and 14 ft. discharge. Two final drives provide independent track reversal for quick, sharp turns or any operation requiring extreme maneuverability.

The Front-End Loader's overhead loading companion (Eimco 105 Excavator) provides discharge without turning plus these features.

Get the facts on both of these versatile machines before you buy!

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